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March 2006

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ADEQ	Arizona Department of Environmental Quality
ADWR	Arizona Department of Water Resources
AMA	Active Management Area
APP	Aquifer Protection Permit
AWQS	Arizona Water Quality Standard
AZPDES	Arizona Pollutant Discharge Elimination System
BNROD	Biological Nutrient Removal Oxidation Ditch
CAP	Central Arizona Project
CAVSARP	Central Avra Valley Storage and Recovery Project
CAWCD	Central Arizona Water Conservation District
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CWA	Clean Water Act
DMA	Designated Management Agency
DPA	Designated Planning Agency
EPA	U.S. Environmental Protection Agency
EPAC	Environmental Planning Advisory Committee
FWS	U.S. Fish and Wildlife Service
GMA	Groundwater Management Act
GSF	Groundwater Savings Facility
HAMP	Houghton Area Master Plan
HCP	Habitat Conservation Plan
HUC	Hydrologic Unit Code
IGA	Intergovernmental Agreement
MADF	Maximum Average Daily Flow
MCL	Maximum Contaminant Level
MDWID	Metropolitan Domestic Water Improvement District
MGD	Million Gallons/Day
NPDES	National Pollutant Discharge Elimination System
NPS	Non-Point Source
PAG	Pima Association of Governments
PCLIS	Pima County Land Information System
PDEQ	Pima County Department of Environmental Quality
POE	Point of Entry
RCRA	Resource Conservation and Recovery Act
SDCP	Sonoran Desert Conservation Plan
TARP	Tucson Airport Remediation Project
TAZ	Traffic Analysis Zones
TDS	Total Dissolved Solids
TIAA	Tucson International Airport Area
TMDL	Total Maximum Daily Load
USF	Underground Storage Facility
USGS	U.S. Geological Survey
VOC	Volatile Organic Carbons
WQARF	Water Quality Assurance Revolving Fund
WWM	Wastewater Management
WWTF / WWTP	Wastewater Treatment Facility / Wastewater Treatment Plant

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EXECUTIVE SUMMARY

Within the greater Tucson community, wastewater must be collected and treated on a continuous basis. Treatment may be accomplished by large publicly-owned treatment facilities, privately-owned facilities serving smaller residential communities, or individual septic systems. This document, known as the *Areawide Water Quality Management Plan* or "208 Plan," provides for the provision of sewage treatment services in a manner that is consistent within the context of a predetermined planning framework. Once adopted, existing and new wastewater facilities must be in conformance with this *Areawide Water Quality Management Plan*.

The federal Clean Water Act, in Section 208, directs states to designate agencies to conduct water quality management planning in defined regions. Once identified as a Designated Planning Agency (DPA), the agency must prepare and implement Areawide Water Quality Management Plans (commonly referred to as "208 Plans"). Pima Association of Governments (PAG) is the designated planning agency for Pima County.

PAG developed the original *Areawide Water Quality Management Plan* (208 Plan) in 1978. Since then, the 208 plan document was amended numerous times. Those amendments were stand alone additions - the result being a cumbersome 208 plan consisting of many separate documents that could not easily be reviewed. Additionally, the original 208 Plan, adopted in 1978, is now out of date, given the extensive urban growth that has occurred in eastern Pima County, the introduction of local habitat protection planning, the changing economic make-up of the region, and new water-related state and federal regulations.

This document represents a comprehensive "update" which combines the original 208 plan and integrates its subsequent amendments into one cohesive and coherent document. This revised and updated plan also incorporates current information on existing point source discharges, areas of water quality problems, and priority surface waters. While this document is primarily focused on wastewater treatment facilities, it also addresses other potential pollutant sources like solid waste disposal facilities and urban stormwater runoff.

Wastewater treatment plants in Pima County have a wide range of capacities, treatment systems and service areas. The majority of the existing wastewater treatment facilities are owned and operated by the two designated management agencies (DMA) in Pima County – Pima County Wastewater Management Department and the Town of Sahuarita. Large, regional treatment facilities serve the metropolitan Tucson area. Small wastewater treatment facilities in Pima County serve small subdivisions, rural communities, parks, schools and prisons. Other facilities are privately owned, and are located in rural areas where it is impractical to connect to DMA-owned infrastructure. Excluding septic systems, capacities range from 15,000 gallons per day to 41 million gallons per day, and treatment technologies vary from evaporative lagoons to complex secondary treatment works. Current service area populations range from approximately 132 people served by the Mt. Lemmon Wastewater Treatment Facility to an estimated 513,557 people residing within the Rogers Road Wastewater Treatment Plant service area.

The 208 Plan is required to maintain a 20-year planning horizon. Therefore, this update to the plan includes projections of future wastewater volumes, using agreed upon population estimates, for the service areas of existing wastewater treatment facilities over a 20-year time period.

208 Plan consistency reviews are required to determine whether a proposal is consistent with the 208 Plan any time new wastewater treatment facilities or expansions of existing facilities are proposed in Pima County. A finding that a facility is consistent with the 208 plan is a requirement that must be met before water discharge permits can be issued. New and existing wastewater treatment facilities must conform to the facility ownership and effluent volumes specified in the 208 Plan in order to be deemed consistent.

This update establishes a set of guiding principles. These include:

PAG's 208 Plan identifies the desirability and preference that new wastewater flows be treated in publicly-owned, regional facilities;

The policies contained in the 208 Plan apply to facilities already constructed even where they may not be in conformance with the 208 Plan;

The plan supports AZPDES permits for municipal stormwater discharges, groundwater remediation projects, reclaimed water projects, and small-volume (i.e., *de minimis*) discharges, encourages riparian restoration projects and effluent re-use, and acknowledges on-site (septic) systems as an acceptable treatment option in some cases;

The plan identifies 18 priority water bodies, and provides that future wastewater treatment facility discharges to these priority water bodies are strongly discouraged by the 208 Plan.

The document introduces the concept of watershed-based 208 planning, which is promoted by both ADEQ and EPA, and which calls for planning within watershed boundaries instead of jurisdictional boundaries.

This 208 Plan update was developed over a period of two years with substantial opportunity for comment by PAG's member jurisdictions. The primary stakeholder groups included PAG's Environmental Planning Advisory Committee and Watershed Planning Subcommittee, both of which approved the plan in February / March 2006. All comments were noted and responded to as part of the public participation effort, which is documented in an Addendum to the 208 Plan.

1. INTRODUCTION

1.1. BACKGROUND

1.1.1. Clean Water Act Section 208

The Clean Water Act began as the Federal Water Pollution Control Act of 1948. Growing concern over water pollution led to major amendments in 1972. With additional amendments in 1977, the law became commonly known as the Clean Water Act. The objective of the Clean Water Act is to restore and maintain the biological, chemical and physical integrity of the nation's waters.

Section 208 of the 1972 Amendments required the governor of each state to identify areas having water quality control problems, delineate the boundaries of these areas, and designate for each area "a single representative organization, including elected officials from local governments or their designees, capable of developing effective areawide waste treatment management plans." The law required each organization designated by the governor to develop a plan for areawide waste treatment management. The "single representative organization" designated by the governor to develop a plan for its respective area is commonly referred to as the "Designated Planning Agency" or "DPA". The plan itself is known as the "Certified Areawide Water Quality Management Plan" or "208 Plan". These terms are defined in Arizona rule under R18-5-301.

In 1974, Governor Jack Williams designated the Pima Association of Governments (PAG) as the DPA for Pima County. This followed Executive Order 70-2, which divided the State of Arizona into six planning districts, with one of the six being Pima County (Figure 1-1). PAG applied for a grant to develop the 208 Plan in 1975. PAG's 208 Plan was approved in 1978. This report is the first region-wide, comprehensive update to that plan.

The Clean Water Act and 40CFR130.6(c) (see Appendix A) specify what must be included in 208 Plans. Among other requirements, the plans must identify the "management agencies necessary to carry out the plan", and they must identify the anticipated municipal and industrial waste treatment works. The "management agencies necessary to carry out the plan" are commonly referred to as "Designated Management Agencies" or "DMAs". This term is defined in Arizona rule under R18-5-301.

1.1.2. History of sewer service and management agency designations in Pima County

The first public sanitary sewers in Pima County were installed in Tucson in 1900, and the first wastewater treatment facility (WWTF) was constructed in 1928. Prior to construction of the treatment facility, wastewater was used directly for farm irrigation. In 1951 Phase 1 of the City of Tucson's Roger Road WWTF began operation, and in 1961 the Pima County Sanitary District #1 installed the first wastewater treatment lagoon at the Ina Road site. This sanitary district was dissolved in 1968 and replaced with the Pima County Department of Sanitation, which was later renamed the Pima County Wastewater Management Department in 1978 (Schladweiler, 2000).

In 1974 the City of Tucson and Pima County created, through an intergovernmental agreement, the Metropolitan Utilities Management Agency. The City and County created this agency to operate water and sewerage systems within the Tucson city limits and the unincorporated areas

of Pima County (PAG, 1975). However, the City of Tucson and Pima County continued to operate their respective sewerage systems. The joint agency was dissolved in 1976 (Schladweiler, 2000).

Also in 1974, Governor Jack Williams designated PAG as the DPA for Pima County. The PAG 208 Plan was completed in1978, and it identified both Pima County and the City of Tucson as Designated Management Agencies responsible for sewerage facilities. However, the EPA preferred a single management agency (Schladweiler, 2000), and the 1978 PAG 208 Plan recommended consolidation of sewage treatment programs in the metropolitan area (PAG, 1978).

In 1979, the ownership and all responsibilities for the construction, operation, and maintenance of the City of Tucson's sewerage systems were transferred to Pima County. In recognition of the pending consolidation of facilities, the PAG Regional Council passed resolution 78-12-07 in December 1978 requesting that the Governor designate Pima County as the single 208 Management Agency (DMA) for municipal wastewater treatment and sewer system operations (see Appendix B). This designation is noted in a 1980 amendment to the 1978 PAG 208 Plan.

The 1979 intergovernmental agreement transferring the sewerage system stipulated that the City would own and have unilateral control over the use and disposition of effluent discharged from metropolitan treatment facilities. The IGA stated that the County was entitled to up to ten percent of the effluent for use on County parks, golf courses and recreational facilities. A supplemental IGA was negotiated in 2000. It addressed control of effluent from non-metropolitan facilities, access by other water providers to effluent derived from their water supplies, and establishment of a conservation pool of up to 10,000 AF per year for use of effluent in habitat conservation plans or other approved projects.

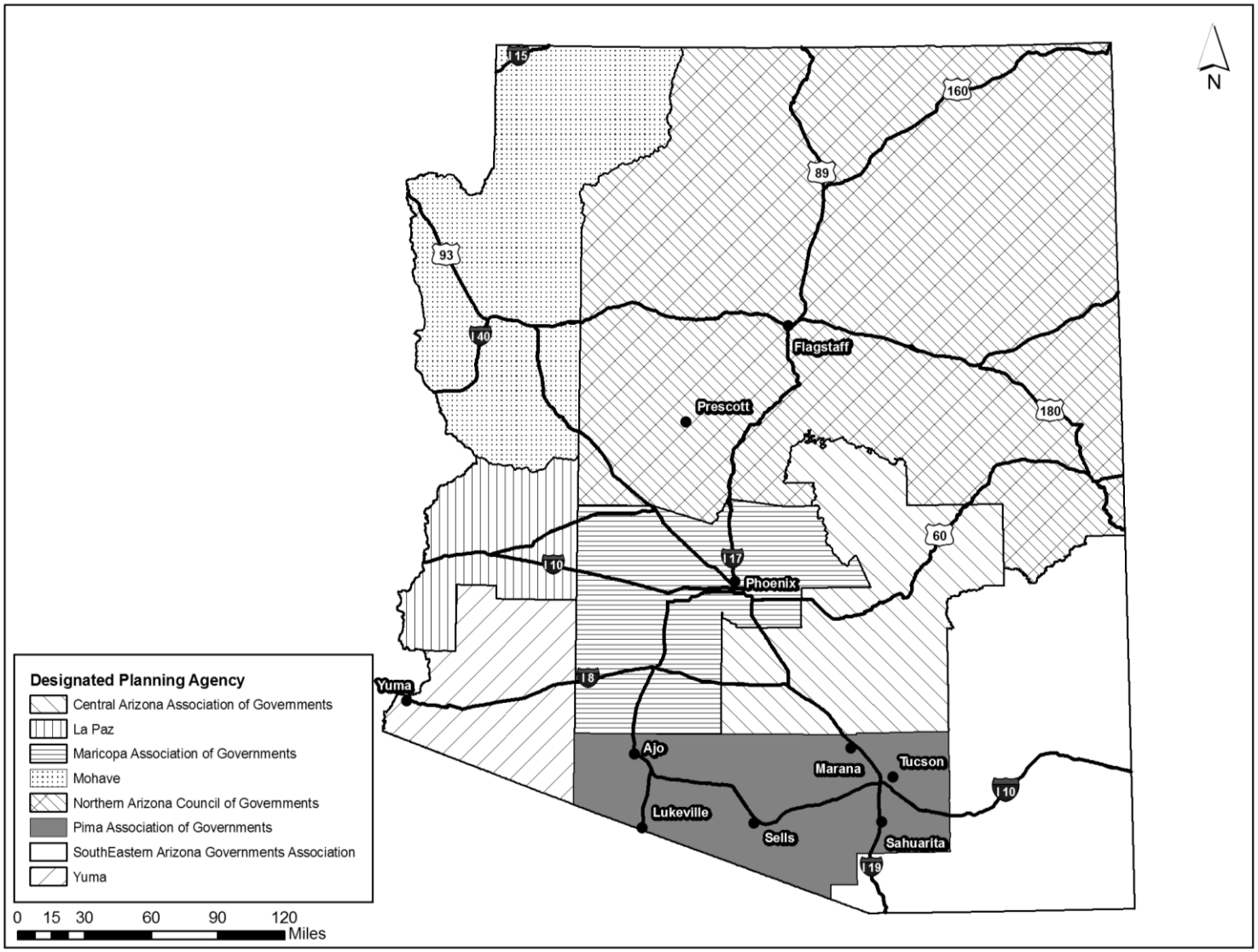
Pima County remained the sole DMA in the PAG planning area until March 1999, when the PAG Regional Council approved a 208 Plan Amendment designating the Town of Sahuarita as a management agency. The area designated for the new Sahuarita DMA encompassed the incorporated Town of Sahuarita limits excluding areas already served by Pima County. No additional DMAs have been proposed.

1.1.3. The need to update the PAG 208 Plan

According to federal regulations (40CFR130.6e), 208 Plans must be updated "as needed" (see Appendix A). The PAG 208 Plan has not had a comprehensive, region-wide update since it was first adopted in 1978. Although PAG has amended the 208 Plan at various times to address unforeseen changes at the sub-regional scale, enough changes have occurred at the local, state and national level to warrant an update to the plan as a whole.

At the local level, the population and the geographic extent of the metropolitan area have changed dramatically. At the time PAG submitted the grant application for developing the original 208 Plan, Pima County's population was estimated at 435,000, and PAG's membership included only Tucson, Pima County and South Tucson (PAG, 1975). Today, PAG's membership includes Tucson, Pima County, South Tucson, Oro Valley, Marana, Sahuarita, the Tohono O'odham Nation, and the Pascua Yaqui Tribe. The 2000 Census showed a Pima County population of more than 840,000. Recent growth rates in suburban communities, as percent change in population between 1990 and 2000, are particularly noteworthy: 519.8% for Marana; 345.3% for Oro Valley; and 99.0% for Sahuarita, which incorporated in 1994. Pima County as a whole grew at a rate of 26.5% between 1990 and 2000 (PAG, 2003).

Figure 1-1. Designated Planning Agencies in Arizona



Pima County is not the only part of Arizona experiencing rapid growth. In fact, the growth rate statewide between 1990 and 2000 was 39.9% (PAG, 2003). In order to better manage the state's growth, "Growing Smarter" legislation was passed by the state legislature and signed by the governor in 1998 and 2000. The Growing Smarter legislation required several new general plan and comprehensive plan elements for cities, towns and counties. This prompted the local governments in Pima County to update their land use plans in the early 2000's. PAG staff helped Pima County develop the water quality element of its new Comprehensive Plan prepared under Growing Smarter. At that time, PAG staff recommended that the 208 Plan be updated as well, in order to ensure consistency between the two plans.

In Pima County, rapid urbanization has prompted the formulation of the Sonoran Desert Conservation Plan (SDCP). The listing of the cactus ferruginous pygmy-owl as an endangered species initially triggered the SDCP proposal, but a key part of the SDCP will be a multi-species habitat conservation plan addressing habitat protection for a number of species of concern. The SDCP is also intended to preserve archaeological and historical sites, as well as local ranching and recreation. The City of Tucson and the Town of Marana are also developing multi-species habitat conservation plans.

Additional changes at the local level include the designation of the Town of Sahuarita as a DMA in 1999, negotiation of a supplemental IGA between the City of Tucson and Pima County in 2000 regarding treated wastewater effluent, additional IGAs between the City of Tucson, Metro Water District and Oro Valley, and passage of the Southern Arizona Water Rights Settlement Act. Also, several wastewater treatment facilities have been constructed since the original 208 Plan was adopted, a number of existing facilities have expanded, and some facilities have closed.

A number of key changes have occurred in state government since the original 208 Plan was adopted. Foremost among these was the creation of the Arizona Department of Environmental Quality (ADEQ) by passage of the Environmental Quality Act in 1986 (ARS §49-102). Whereas the original 1978 PAG 208 Plan identified the Arizona Department of Health Services – Bureau of Water Quality Control as the state water pollution control agency, the Environmental Quality Act established ADEQ as the agency responsible for all the major federal water quality legislation. The Act also established the Aquifer Protection Permit (APP) program to protect the quality of the state's aquifers. All discharging facilities (including wastewater treatment facilities) must now obtain APPs. Arizona obtained primacy for the National Pollution Discharge Elimination System (NPDES) in 2002. With state primacy, ADEQ now issues "AzPDES" permits as well as APPs. ADEQ also regulates the reuse of treated effluent and enforces reclaimed water standards.

Another change at the state level was passage of the Arizona Groundwater Management Act (GMA) in 1980. The purpose of the GMA is to address the issue of groundwater overdrafting in several critical areas of the state. The GMA requires the Arizona Department of Water Resources (ADWR) to administer safe-yield and 100-year assured water supply requirements in Arizona. The GMA also established the active management areas (AMA), one of which is Tucson. The AMAs are areas in the State that have severe groundwater overdraft problems. The safe-yield goal and assured water supply requirements have led to increased emphasis on the efficient reuse of wastewater. The GMA is incorporated in Arizona Revised Statute Title 45.

At the federal level, changes related to the Clean Water Act have also occurred since 1978. One change is the level of funding available for 208 Planning and 208 Plan implementation. In the 1970s and early 1980s, funding authorized by Section 208 of the Act for developing and

operating the 208 Plans was approximately $100,000,000 per year. Today, federal funding for 208 Planning in Arizona is primarily through section 604(b) grants, which in Arizona are limited to a total of $100,000 for the entire state (EPA, 2003). By comparison, the amount of the grant requested by PAG to develop the 208 Plan in 1975 was $1,260,403 (PAG, 1975). Other changes include replacement of the construction grants program with the Clean Water State Revolving Fund, a shift in focus to watershed-based strategies, increased emphasis on Total Maximum Daily Loads (TMDLs), and increased focus on non-point sources of pollution such as municipal stormwater runoff.

1.1.4. Use of the 208 Plan

208 Plans are used to direct implementation. The plans identify priority point and nonpoint water quality problems, consider alternative solutions, and recommend control measures. Control measures can include financial and institutional measures necessary for implementing recommended solutions. State annual work programs are based on the priority issues identified in the State Water Quality Management Plan (40CFR 130.6b – see Appendix A).

208 Plans identify anticipated municipal and industrial wastewater treatment facilities. Federal regulations preclude the issuance of NPDES permits to facilities that are not consistent with the applicable 208 Plan (§208{e}; 40CFR130.6{f} – see Appendix A). State regulations preclude construction of sewage treatment facilities that are not consistent with the applicable 208 Plan (R18-5-303), or issuance of an APP to sewage treatment facilities that are not consistent with the 208 Plan (R18-9-A201B). An up-to-date 208 Plan is necessary to ensure efficient permitting decisions with regard to determining 208 consistency.

A key benefit of 208 Planning is that waste treatment occurs in an efficient manner and is planned on a regional basis. Lack of regional planning (or lack of implementation of an approved regional plan) could lead to a proliferation of small, privately operated sewage treatment facilities that are built for individual subdivisions and other residential, commercial and industrial developments. Such an approach would result in water quality management being the responsibility of numerous entities with varying levels of experience with local conditions. A proliferation of unplanned sewage treatment plants could lead to difficulties in sewering adjacent privately-owned properties, particularly if adjacent, upgradient areas become land-locked. Concerns about potential impacts to water quality, long-term reliability of small plants, additional strain on resources available for inspection and enforcement, and competition for federal funds, all lend support to proper planning for wastewater treatment. In addition, should a waterbody be identified as impaired, a proliferation of discharges by numerous entities to that waterbody would likely complicate efforts to improve the water quality and prepare a TMDL. 208 Planning helps to avoid these situations, promotes benefits from economies of scale, provides a means for the general public to be involved in regional environmental decision-making, and helps avoid conflicts among neighboring jurisdictions.

1.2. Required Elements in an Areawide Water Quality Management Plan

1.2.1. Federal requirements (40 CFR 130.6 – see Appendix A)

Federal regulations state that the following elements must be included in the 208 Plan or referenced as part of the Plan if they are contained in separate documents:

- Total maximum daily loads
- Effluent limitations
- Identification of anticipated municipal and industrial waste treatment works

- Nonpoint source management and control
- Identification of agencies necessary to carry out the plan
- Identification of implementation measures necessary to carry out the plan
- Identification and development of programs for the control of dredge or fill material
- Identification of any relationship to applicable basin plans developed under section 209 of the Act.
- Identification and development of programs for control of ground-water pollution including the provisions of section 208(b)(2)(K) of the Act.

The complete text of the relevant regulations is included in Appendix A.

1.2.2. State requirements (Arizona Continuing Planning Process, April 1993)

The most recent document describing Arizona's Continuing Planning Process (ADEQ, 1993) includes a checklist for 208 Plan Amendment content requirements. The state requirements generally mirror the federal requirements. A copy of the ADEQ checklist is included as Appendix C.

1.3. PURPOSE AND SCOPE OF THIS UPDATE

The purpose of this update to the PAG 208 Areawide Water Quality Management Plan is to provide a comprehensive guide to the PAG planning area and provide a format for implementing waste management responsibilities in the PAG portion of the Santa Cruz River and San Pedro River watersheds. This update addresses issues that have emerged since approval of the original PAG 208 Plan in 1978, and it incorporates the individual plan amendments approved since 1978. The goal of this updated document is to provide the foundation for a common, consistent basis for rational decision making and to provide consistency for water and sewer planning activities

The primary scope of this update is the required 208 Plan elements identified in 40CFR §130.6(c)(3) and 40CFR §130.6(c)(5) (see Appendix A), which address municipal and industrial waste treatment and management agency designations. This report thus focuses on existing and planned point source discharges from waste treatment facilities, the projected discharge volumes, the discharge locations, and the management agencies responsible for these facilities and their service areas. Also addressed are any significant changes in anticipated future needs for new facilities or for expansions of existing facilities. The projections for future facilities and expansions of existing facilities are based on a parallel 201 Facilities Planning effort undertaken by Pima County Wastewater Management Department (WWM).

In addition, a key use of this report is to consolidate the various individual amendments and updates that have been made to the original 1978 208 Plan into one readily accessible document. Clarification of policies and updated information on environmental regulations and regulatory agencies are also included. Of particular importance is clarification of policies regarding issuance of discharge permits pursuant to state (R18-9-B201H) and federal (40CFR 130.6f – see Appendix A) regulations requiring permitting decisions to be made in accordance with 208 Plans. AzPDES permits and APPs cannot be issued to facilities that are not consistent with the applicable 208 Plan.

An important goal of this report is to make determination of 208 consistency easier. It is currently a challenge to determine 208 consistency for a particular proposed permit or facility in the PAG region, because the PAG 208 Plan consists of numerous documents, including the

original 1978 Plan, various amendments and minor updates, and incorporation by reference of several 201 Facility Plan updates and other documents. Many of these documents are very old, with limited copies available for public review and use by PAG and ADEQ staff. Very few are available electronically. The intent is for future 208 consistency determinations to be made using this document alone.

Additional goals are to integrate the 208 Plan with other water quality planning programs, and to integrate water quality and resource planning with land use and infrastructure planning. This update to the 208 Plan also explores ways to encourage regional wastewater treatment and conveyance as a preferred alternative to on-site systems, and establishes regionally agreed upon policies for protecting high priority surface waters in Pima County.

In addition, although this update to the 208 Plan focuses on point source discharges, it also addresses urban stormwater runoff and establishes appropriate regional policies for managing stormwater and issuing municipal stormwater NPDES permits. This update also addresses disposal of residual waste (i.e., landfills, sludge disposal, and recycling). Beyond these, however, nonpoint source management and control is generally outside the scope of this update. The other elements of nonpoint source management and control are currently addressed by the existing PAG 208 Plan and the State of Arizona's nonpoint source program, and they could be the focus of a future update to the PAG 208 Plan should the need arise.

Finally, development of new Total Maximum Daily Loads (40CFR 130.6{c}{1} – see Appendix A), effluent limitations (40CFR 130.6{c}{2} – see Appendix A), and dredge and fill programs (40CFR 130.6{c}{7} – see Appendix A), beyond any that have already been approved by the State of Arizona and/or U.S. EPA, are specifically outside the scope of this update. These elements could be the focus of future updates to the PAG 208 Plan if necessary.

In summary, the specific objectives of this update to the PAG 208 Plan are:

1) to consolidate the original 1978 208 Plan, and the various individual amendments and updates to the original 208 Plan, into one readily accessible document, particularly with regard to identification of point sources and policies regarding municipal and industrial waste treatment facilities;
2) to provide an updated description of the PAG planning area, particularly the quality of all major water sources, the regulatory agencies and programs that protect water quality, and areas with water quality problems;
3) to clearly identify existing and planned point source discharges from waste treatment facilities, the projected discharge volumes, and the discharge locations;
4) to clearly identify the Designated Management Agencies for waste treatment facilities and their service areas;
5) to describe plans for disposal of residual waste; and
6) to clearly and concisely describe regional policies regarding:
    - issuance of permits and determination of 208 consistency;
    - integration of 208 planning with other water quality planning, land use planning, and infrastructure planning programs;
    - use of regional wastewater treatment infrastructure vs. on-site treatment and disposal systems;
    - stormwater runoff management; and
    - protection of the highest priority surface waters in Pima County.

2. SUMMARY OF ORIGINAL 208 PLAN, AMENDMENTS AND POLICIES

The first objective of this 208 Plan Update is to consolidate the original 1978 208 Plan, and the various individual amendments and updates that have been made to it, into one readily accessible document. The focus of this objective is the municipal and industrial waste treatment facilities and other point sources identified in the current plan, as well as the associated policies that have been adopted through various amendments. Chapter 2 addresses this objective.

2.1. OVERVIEW OF THE ORIGINAL 208 PLAN

The PAG Regional Council approved the 208 Areawide Water Quality Management Plan for Pima County on June 22, 1978. The Plan identified the roles of federal, state, regional and local governments in water pollution control, and addressed both point and non-point sources of pollution. The Plan identified the City of Tucson and Pima County as DMAs for their respective parts of the Tucson metropolitan area sewerage system. Pima County was identified as the DMA for rural parts of Pima County.

The final 1978 208 Plan report (PAG, 1978), which was essentially a summary report based on numerous supporting documents, noted that facility needs in the Tucson metropolitan area would be addressed in a parallel 201 facilities planning program; the 201 Facility Plan, once adopted, would become part of the 208 Plan. The 208 Plan stated that 201 facilities planning and best management practices planning would be the prime responsibility of the City and County sewerage management agencies, and that all 201 planning would be consistent with the recommendations for wastewater treatment contained in the approved 208 Plan.

The adopted 201 Facility Plan, *Metropolitan Tucson Regional Wastewater Management System* (Brown and Caldwell, 1978), consisted of five documents: a summary/background report and four supplements. The four supplements were:

1) Regional Wastewater Treatment System
2) Regional Interceptor System
3) Environmental Impact Assessment
4) Outlying Facility Plans

The Facility Plan provided a much greater detailed description of the wastewater treatment facilities identified in the *Areawide Wastewater Management Plan.* However, it did not identify any additional facilities, with the exception of a replacement facility for the Catalina WWTP proposed to be located 2 miles south of the existing (at that time) facility.

2.2. POINT SOURCES IDENTIFIED IN THE ORIGINAL 208 PLAN AND AMENDMENTS

The 1978 *Areawide Wastewater Management Plan* listed numerous point sources, including public wastewater treatment facilities in the metropolitan area, public wastewater treatment facilities outside the metropolitan area, and non-public point sources. The point sources included in the 1978 document are listed on Table 2-1.

Table 2-1. Point Sources Identified in the June 1978 PAG Areawide Wastewater Management Plan (PAG, 1978)

Facility	*1978 Capacity or Flow "Q" (mgd)*	*Future Capacity or Load Projections (mgd) {year}*
Ajo	single pond	no plans
Animal Control Ctr.	0.0025 capacity, 0 present Q	0
Arivaca Junction	0.050 capacity, 0.040 present Q	0.228 {2000}
Arizona Feeds Poultry Farm	--	--
Arizona Hog Farm Co.	--	--
Arizona Youth Center	0.014	0.029 {2000}
Asthmatic School	out of service	0
Avra Valley	0.220 capacity, 0.426 present Q	0.784 {2000}
Branding Iron	0.010 capacity, out of service	--
Catalina	0.025 capacity, 0.020 present Q	To be relocated
Corona de Tucson	0.056 capacity, 0.028 present Q	0.067 {2000}
Del Norte	0.015 capacity, 0.010 present Q	0.044 {2000}
Desert Museum	0.010 capacity, 0.016 present Q	0.031 {2000}
Fairgrounds	0.004 capacity, 0 present Q	--
Gilbert Ray Campgrounds	0.005	0.009 {2000)
Green Valley	0.418 capacity, 0.494 present Q	1.336 {2000}
Highlands	Scheduled for incorporation into metro system	
Hughes Aircraft	0.075 MGD	--
Ina Road	25 capacity; 8.5 present Q	--
Lukeville	--	--
Marana	0.030 capacity 0.026 present Q	0.040 {2000}
Marana School (Jr. High)	0.040 present Q	0.062 {2000}
Mountain Gardens	0.010 capacity, 0.004 present Q	0.007 {2000}
Mt. Lemmon	0.006 capacity, 0.015 present Q	0.015 {2000}
Pacific Fruit Express	--	--
Organ Pipe Cactus N.M.	--	--
Palisades Ranger Station	“discharged in past”	--
R & M Farms feedlot	--	--
Randolph Park	1.5	--
Rillito Vista	under construction	--
Roger Road	37 capacity; 27 present Q	--
Santo Tomas	0.070 capacity, 0.035 present Q	To be abandoned
Shamrock Farms	--	--
Silverbell	--	--

“ – “ = not specified

All information in Table 2-1 is from the June 1978 PAG *Areawide Wastewater Management Plan;* see Table 2-3 for current list of point sources and updated information about them.

Various 208 Plan Amendments and minor updates approved since 1978 have identified additional point sources, including facilities that existed at the time and facilities that were proposed for the future. The amendments and updates are listed on Table 2-2 along with other Regional Council actions significantly affecting the 208 Plan since 1978. The point sources identified in the amendments and updates are listed on Table 2-3. Figure 2-1 is a map showing the locations of all the point sources (existing, closed and proposed) previously identified in the PAG 208 Plan as of December 2005.

Table 2-2. Amendments and Updates to the PAG 208 Plan, and Other Related Regional Council Actions, 1978 – 2005

#	*Title*	*Author*	*Year*	*Libr #*
1	PAG Areawide Wastewater Management Plan 1980 Amendment	PAG	1980	
2	El Conquistador Wastewater Reclamation Facility and Service Area	PAG	1981	44
3	Amendment to PAG 208 Plan Point Source Element: Mt. Lemmon	PAG	1981	43
4	Domestic Point Source Water Quality Planning Update Report for Areas A1 & A2	PRC Toups for PAG	1982	52
5	Domestic Point Source Water Quality Planning Update Report for the Upper Canada del Oro Area	PRC Toups for PAG	1982	50
6	Metropolitan Tucson Regional Wastewater Management System Facility Plan: Sludge Management and Disposal Program for the Roger Road Wastewater Treatment Facility	Pima County Wastewater Management Department	1983	116
7	Regional Council Implementation of Processing Fee of $3500 for administration of 208 Plan Amendments	PAG	1984	
8	Facility Plan Report Proposed 208 Point Source Element Amendment for MSP Companies WWTF	Greiner Engineering	1984	*
9	Foothill Utility Wastewater Reclamation Facility Broadmoor Golf Course	Dooley-Jones & Assoc	1984	*
10	Green Valley Cortaro Area Management Plans	PAG	1984	
11	Areawide Wastewater Management Plan Point Source Update	PAG	1985	85
12	Continental Ranch 208 Consistency Report – Continental Ranch Pump Station	WLB Group	1986	90
13	Catalina 208 Consistency Report and Plan Amendment (one document 1985 and 1987)	Pima County Wastewater Management Department	1987	93
14	208 Plan Amendment for Canada Hills Development Company L.P.	Arthur Beard Eng	1987	*
15	Marana Study Area 208 Consistency Report	Pima County Wastewater Management Department	1988	95
16	Regional Council statement that the Target Area concept may be acceptable for the 208 planning process only when the plan amendment or consistency analysis is initiated by a public jurisdiction which is subject to land acquisition regulation	PAG	1988	
17	Guide to Areawide Water Quality Management Planning as Required Under Section 208 of the Clean Water Act	PAG	1990	99
18	208 Consistency Report for MSP Companies WWTF	WLB Group	1992	
19	208 Plan Amendment for Management & Training Corporation – Marana Treatment Facility, Wastewater Reclamation Facility	Moore and Associates, Inc.	1993	110
20	208 Plan Amendment for La Mirage Estates Wastewater Treatment Facility (WWTF)	ICON Consultants	1995	112

#	*Title*	*Author*	*Year*	*Libr #*
21	Criteria for Establishing New Designated Management Agencies in Pima County (Regional Council policy)	PAG	1998	
22	The Wastewater Management Plan for Sahuarita – An Amendment to the PAG Areawide 208 Plan	Town of Sahuarita	1999	135
23	Ajo Improvement Company 208 Plan Amendment	Ajo Improvement Company	1999	136
24	Standard Outline guidance document for private wastewater facilities pursuing a 208 Plan Amendment (Regional Council policy)	PAG	1999	
25	Marana 208 Areawide Water Quality Management Plan Update	Malcolm Pirnie	2000	
26	Corona de Tucson Wastewater Treatment Facility Expansion Consistency Report	Pima County Wastewater and PAG	2004	

Table 2-3. Point Sources Identified in Amendments and Updates to the PAG 208 Plan Since 1978

Facility [(1)]	*Location*	*Owner*	*Capacity*	*Ref* [(2)]	*Notes*
Adonis Mobile Home Park	Marana area	--	--	19, 24	Ponds; 208 Amendment {24} suggests retiring the Adonis system once County wastewater service is available in the area.
Ajo Improvement Company WWTF	Ajo, between Well Road and the Phelps Dodge tailing pond; T12S, R6W, Section 14	Ajo Improvement Company	0.6 MGD	22	208 Plan Amendment {22} recommended this new facility to replace the existing inadequate pond facility.
Arivaca Junction		Pima County	0.075 MGD	10	Existing
Broadmoor a.k.a. Canada Hills	Oro Valley, near Lambert Ln, Naranja Dr, La Canada Dr.	Foothills Utility company	1.0 MGD	9, 11	Proposed by Atlas-Glenex but never built. Superseded by amendment {14} in 1987 calling for connection to regional system instead of construction of new facility.
Catalina Wastewater Treatment Plant	Catalina, one mile south of Pinal County line, discharge to Big Wash via NPDES	Pima County	25,000 gpd	5, 13	Existing at time, no longer exists. Recommended in 1982 for expansion or replacement at same site. Future regional facility proposed in 1982. 208 Amendment {13} in 1982 concluded that connection to existing regional facility via a new sewer line would be equally appropriate.
Corona de Tucson	T 17 S, R15 E, Sec 10	Pima County	1.3 MGD	26	Existing. Consistency Report was for proposed expansion.
El Conquistador	T12S, R14E, west half of Sec 18	Foothills Water Company	0.22 MGD {2} 1 MGD {11}	2, 11	Proposed and constructed; now closed.
Green Valley	Green Valley at Santa Cruz River T17S, R13E	Pima County	1 MGD to 3 MGD 4.1 MGD noted in Sahuarita 208 P.A.	10, 21	Existing.
Harrison-Pantano Wastewater Reclamation Facility	Vicinity of Pantano Wash and Harrison Rd	Pima County	1 MGD minimum	11	Proposed. Identified in 1985 208 Plan Amendment {11} as “necessary at some time in the future”
Highlands	Near Lambert Ln and the Canada del Oro Wash	Pima County	--	1	Existing at time, recommended to be abandoned when CDO interceptor completed. Now closed.

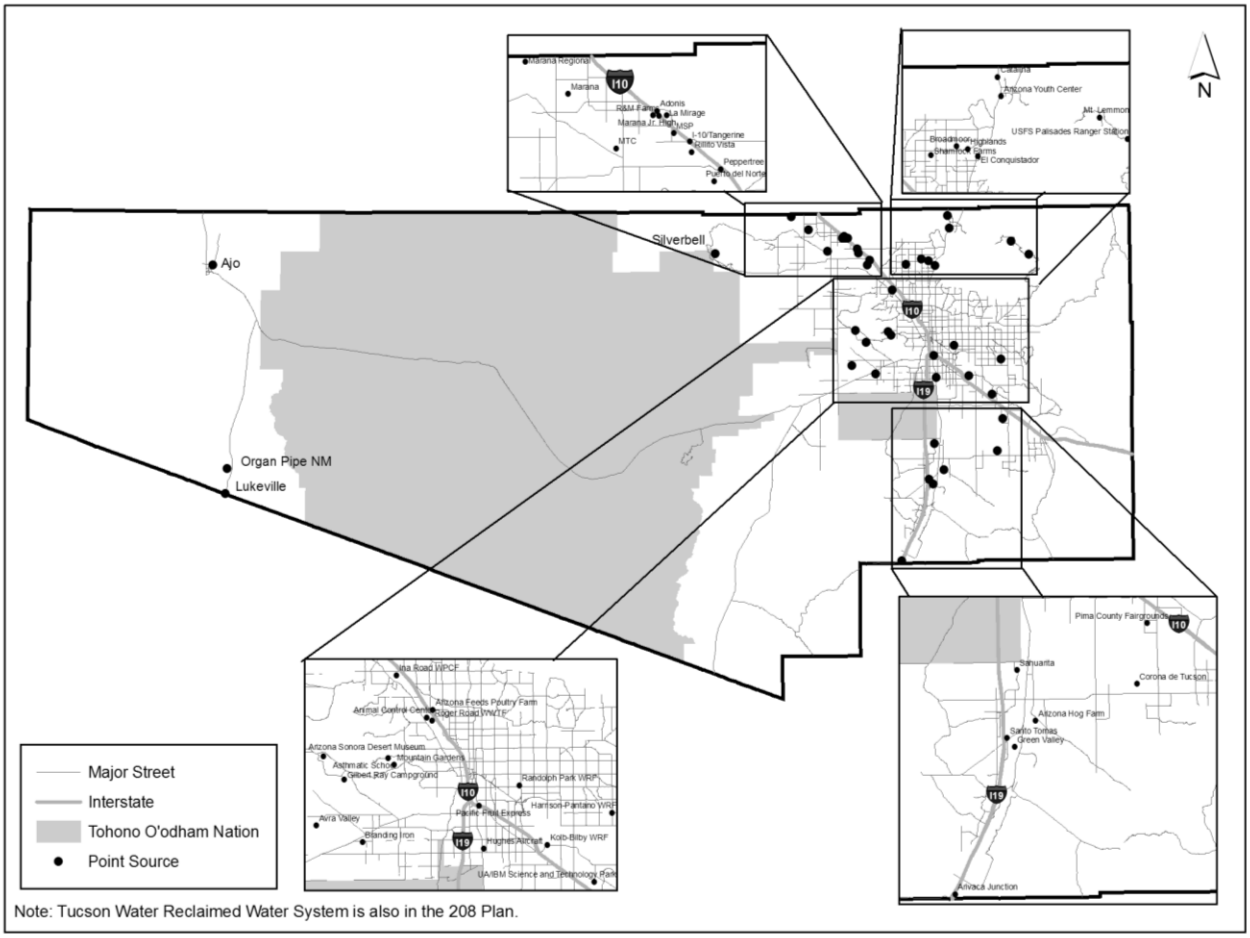
Facility [1]	*Location*	*Owner*	*Capacity*	*Ref* [2]	*Notes*
Ina Road Water Pollution Control Facility	Santa Cruz River near Ina Road alignment	Pima County	50 MGD recommended in 1990 201 Facility Plan Update.	11	Existing regional facility. Additional digestion facilities, various modifications to improve efficiencies recommended in 208 Amendment {11} in 1985. Additional expansion of Roger Rd WWTF, construction of a plant interconnect and expansion of the Ina Road WPCF, or both, to combined capacity of 77 MGD recommended in 208 Amendment {11} in 1985. The 1985 208 Amendment {11} recommended a 201 Facility Planning effort; 1990 201 Facility Plan Update recommended phased expansion to 50 MGD.
Kolb-Bilby Wastewater Reclamation Facility	Vicinity of intersection of Craycroft Rd. and Valencia Rd.	Pima County	1 MGD minimum	11	Proposed. Identified in 1985 208 Plan Amendment {11} as "necessary at some time in the future" but "will not be needed as soon as in the Harrison-Pantano area"
La Mirage Estates	Marana, east of I-10 and south of Grier Rd	--	--	19	Proposed but never built; 208 Amendment {19} that proposed the facility has expired. A subsequent proposal for a 208 Amendment was granted preliminary approval by the PAG Regional Council in February 2000, contingent upon several actions being completed by the developer. As of December 2003, these actions had not been completed.
Management & Training Corp. (MTC) Marana Treatment Facility	Marana, west of Sanders Rd. and north of Silverbell Rd.	MTC	65,000 gpd, proposed up to 130,000 gpd	18, 24	Proposed and constructed. Serves Community Treatment Complex only; will be abandoned and removed when regional facilities are available.
Marana	Santa Cruz River in Marana; T11S,R10E, SE ¼ of Sec 14.	Pima County	0.023 MGD {15} 3 MGD {24}	4, 15, 24	Existing; 2 ponds in parallel; 1982 208 amendment {4} recommended expansion or upgrade after 5-10 years; 1988 208 Amendment {15} considered relocating out of floodplain. 2000 Amendment {24} indicates eventual expansion to 3 MGD. When flows reach 2.4 MGD, plans for regional WWTP at County Line or pump station to send flows to I-10/Tangerine site should be initiated.
Marana Jr. High	T11S,R11E, NE ¼ Sec 27	Marana School District	--	15, 24	Serves school exclusively, not envisioned to provide service to surrounding areas

Facility [1]	*Location*	*Owner*	*Capacity*	*Ref* [2]	*Notes*
Marana County-Line Regional	Santa Cruz River at Pinal County line	Pima County	1.9 MGD {15} 4.8 MGD {24}	15, 24	Proposed
Marana I-10/Tangerine	I-10 and Tangerine	Pima County	18.0 MGD {24}	24	Proposed; according to 208 Amendment {24}, construction would be triggered by average daily flow rate of 5.4 MGD at Continental Ranch Pump Station.
Mount Lemmon	Mount Lemmon	Pima County	18,189 gpd	3	Proposed and constructed to eliminate discharges to Sabino Creek
Peppertree	SW corner Avra Valley Road and I-10	Pima County	--	4	Proposed; never built. Subsequent 208 Plan Amendment {12} recommended pump station instead.
Puerto del Norte	Silverbell and Linda Vista; T12S,R12E	Pima County	15,000 gpd	4	Existing at time, recommended for closure; now closed; served mobile home park
Rillito Vista	South of Tangerine, East of Santa Cruz River; T12S,R12E, southwest ¼ of Section 6	Pima County	9400 gpd	4, 15, 24	Existing; 2 ponds; 208 Amendment {4}: serves approx. 59 lots; ultimately to be abandoned 208 Amendment {15}: future expansion of the facility not anticipated; abandonment will be considered when public trunk sewers are constructed nearby
Roger Road	Santa Cruz River near Roger Road alignment	Pima County	208 Plan Amendment {6} (1983): 30 MGD, Phase II to 40 MGD, Phase III to 50 MGD 208 Plan Amendment {11} (1985): Expansion to 41 MGD 50 MGD specified in 1990 201 Facility Plan update.	6, 11	Existing regional facility. 1983 208 Amendment {6} recommended transfer of treated sludge from Roger Road to Ina Road WWTF via pipeline. Expansion to 41 MGD, including additional digestion facilities, recommended in 1985 208 Amendment {11} Additional expansion of Roger Rd WWTF, construction of a plant interconnect and expansion of the Ina Road WPCF, or both, to combined capacity of 77 MGD recommended in 208 Amendment {11} in 1985. The 1985 208 Amendment {11} recommended a 201 Facility Planning effort; 1990 201 Facility Plan Update recommended phased expansion to 50 MGD.

Facility [1]	*Location*	*Owner*	*Capacity*	*Ref* [2]	*Notes*
Sahuarita	T16S, R13E SE ¼ Section 36	Town of Sahuarita	3 MGD	21	Proposed and constructed. Service area excludes areas already served by Pima County.
Santa Tomas	Green Valley near Santa Cruz River T17S,R13E; south of GV WWTF	Pima County	0.070 MGD	10	Closed.
Shamrock Dairy	--	--	--	10	Existing at time; ponds now closed.
South Marana (aka MSP)	west of I-10 / Tangerine; T11S,R11E, NW ¼ Section 36	Pima County (to be constructed by developer and then transferred to County)	1.82 MGD	8, 15, 17	Proposed with Amendments {8} in 1984 and {17} in 1992 but never built. 208 Plan Amendment {8} for this facility superseded by 208 Plan Amendment {17}. 208 Amendment {15} approved in 1988 also noted that trunk sewer to regional site might be constructed instead of this facility. 208 Amendment {17} set 12/31/97 as deadline for construction, otherwise 208 Amendment {17} will "no longer be in effect" and 208 Amendment {8} would "prevail".
Tucson Water Reclaimed Water System	Tucson metropolitan area	City of Tucson	--	11	Existing. System is identified in the 1985 208 Amendment {11}; PAG's April 1990 Guide to 208 Planning {16} notes memos written in conjunction with approval of Amendment {11} indicate facilities are "grandfathered" in along with Tucson Water's wastewater reuse plan.

(1) Includes existing and proposed facilities
(2) Reference is document listed on Table 2-2.
Numbers in { } indicate the source of the information is the corresponding document referenced in Table 2-2.
" – " = Not specified

Figure 2-1. Locations of Point Sources (existing, closed and proposed) Previously Identified in the PAG 208 Plan



2.3. RECOMMENDATIONS AND POLICIES IN THE ORIGINAL 208 PLAN AND AMENDMENTS

The 1978 208 Plan included the following recommendations regarding point sources:

- Consolidation of the sewage treatment program in metropolitan Pima County
- Integrated regional strategies to reuse treated domestic wastewater
- Joint City/County planning for future sewage treatment facilities construction
- Integration of phased improvements to the wastewater system with other public investment programs
- Integration of facilities planning with land use planning
- Regional water conservation and wastewater flow reduction program

The PAG region has successfully implemented most of these recommendations. Sewage treatment in the metropolitan area has been consolidated under the Pima County Wastewater Management Department, and effluent reuse and water conservation are accomplished through Tucson Water's reclaimed water system and Tucson Water's and the Water Conservation Alliance of Southern Arizona's water conservation programs. Joint planning for future sewage treatment facilities is accomplished through PAG's 208 program.

Recommendations regarding non-point sources included:

- Control of solid waste dumping in arroyos
- Public education on control of urban pollutants like pesticides and trash
- Coordination by the PAG 208 program of the above activities, which should be carried out by the City and County
- Monitoring of stormwater runoff
- Integration of stormwater runoff into water resource management planning
- Landfill monitoring
- Regional solid and liquid waste management program coordinated by PAG
- Public education program on proper operation and maintenance of septic tanks
- Other recommendations for addressing agricultural, rangeland and mining activities

Most of the non-point source recommendations have also been followed. The local jurisdictions, particularly Pima County Department of Environmental Quality's (PDEQ) wildcat dump program, control solid waste dumping in arroyos. Local stormwater management agencies educate the public about urban pollutants, and they monitor stormwater quality. The City and County monitor groundwater quality near landfills pursuant to the Resource Conservation and Recovery Act (RCRA) and APP regulations. Pima County Wastewater manages biosolids through a comprehensive reuse and disposal program. PDEQ conducts education programs regarding septic tanks. In addition to these local activities, ADEQ has a non-point source program addressing agricultural, rangeland, mining and other non-point sources of pollution.

Implementation of some of the non-point source recommendations in the original PAG 208 Plan has been limited. One example is the recommendation that PAG coordinate a solid waste management program. PAG's work in solid waste has mostly focused on pollution source assessments, identification of historic solid waste disposal locations, and well inventories near solid waste disposal areas. Another example of limited implementation is the recommendation regarding integration of stormwater runoff into water resources management planning.

Although stormwater runoff is managed and monitored, detailed plans for using it as a water resource on a regional scale are lacking.

Amendments and updates to the original 208 Plan, particularly the 1980 amendment and the 1985 *Areawide Wastewater Management Plan Point Source Update Metropolitan Basin* (Greeley and Hansen, 1985), clearly articulated a number of policies related to water quality planning. Key policies include:

- Wastewater reuse should be used as a disposal alternative wherever possible. *{1980 Amendment}*
- Introduction of toxic and incompatible pollutants to the public sewage treatment system shall be reduced through the industrial pretreatment program to levels necessary to protect groundwater quality and to allow maximum sludge reuse options. *{1980 Amendment}*
- Facilities planning for sewage treatment should be integrated with other planning activities. *{1980 Amendment}*
- Within planned service areas where treatment and conveyance capacity exists, public and private treatment facilities should not be allowed where the facility would treat primarily compatible pollutants. *{1980 Amendment}*
- Within planned service areas where treatment and conveyance capacity is not yet in place, facilities shall be allowed provided the design, location, and financing arrangements conform to, or are not inconsistent with, the terms of intergovernmental agreements between Pima County and the affected City or Town, the rules and regulations of the State Health Department, and is approved by the jurisdiction in which the facility is located. *{1980 Amendment}*
- Within planned service areas, proposed private facilities treating non-compatible wastes shall be required if Pima County Wastewater Management has determined that the wastes could not be handled by public facilities. *{1980 Amendment}*
- PAG's Environmental Planning Advisory Committee (EPAC) and Regional Council should review 201 facility plans for consistency with regional population projections and land use plans. *{1980 Amendment}*
- Both Pima County Wastewater and Tucson Water are designated to perform technical review functions for 208 Plan Amendments. *{1985 Point Source Update}*
- All wastewater should be treated in regional facilities, except for remote areas or areas where it can be clearly demonstrated by the builder that a small plant is environmentally and economically preferable to regional treatment from the point of view of the public good. *{1985 Point Source Update}*
- Small permanent wastewater treatment plants may be permitted in areas where integration into the regional wastewater system is neither planned nor anticipated and only after regional approval. A permanent facility will only be constructed if it is functionally and environmentally sound and is the most cost-effective alternative (to the public) for relief of deficiencies of conveyance system capacity. *{1985 Point Source Update}*
- Temporary treatment facilities are prohibited unless needed because of lack of planned service to the area and a temporary plant is the most environmentally and economically beneficial (to the public) way of providing wastewater treatment or effluent reuse. *{1985 Point Source Update}*
- Small public wastewater treatment facilities may be deemed to be consistent with the 208 Plan following Regional Council approval of a 208 consistency report. *{1985 Point Source Update}*

- Private treatment plants for the treatment of domestic wastewater are prohibited unless a long term public benefit is demonstrated by the builder (applicant) of such a facility and then only if Pima County declines to serve the area in question in the best interests of the public because:
  - The proposed service area is not currently serviceable by an existing public facility; and
  - There is no plan within the adopted Pima County Capital Improvement Plan to provide a public facility to serve the proposed service area; and
  - The private facility is the most cost-effective to the public in the long term. *{1985 Point Source Update}*
- A proposed private facility must not jeopardize future public facility service to upstream areas. *{1985 Point Source Update}*
- A treatment plant otherwise consistent with the 208 Plan, and constructed under a privatization financing agreement with the Management Agency and/or other appropriate local jurisdictions, is deemed consistent with the 208 Plan if the responsibility for management and operation of the facility rests with the public agency. *{1985 Point Source Update}*
- Private facilities that are required by current industrial pretreatment ordinances for the pretreatment of industrial wastes before disposal to the public sanitary sewer are consistent with the 208 Plan. *{1985 Point Source Update}*
- Private wastewater treatment plants are not encouraged and therefore are not considered to be consistent with the 208 Plan. All proposed private plants will require approval of a 208 amendment. *{1985 Point Source Update}*
- The practice of effluent reuse is strongly endorsed by the PAG Regional Council and its member jurisdictions. *{1985 Point Source Update}*
- Planning for wastewater treatment and effluent reuse treatment facilities will be done jointly by Pima County, the City of Tucson and local jurisdictions and will require Regional Council approval. *{1985 Point Source Update}*
- Private developments desiring effluent for use within a proposed project are encouraged to utilize effluent supplied by the City of Tucson via the Metropolitan Effluent Delivery System. *{1985 Point Source Update}*
- Large public facilities (>2 MGD) will require formal 208 amendment. *{1985 Point Source Update}*
- Small public facilities (<2 MGD) may be deemed consistent with the 208 Plan through approval of a consistency report. *{1985 Point Source Update}*
- All wastewater treatment plants must include an environmentally compatible method of effluent and residuals disposal or reuse. This method must not place a significant economic burden on other users of the system and must not be inconsistent with the adopted regional effluent reuse plan. *{1985 Point Source Update}*
- All wastewater treatment plants must be at a site approved by Pima County Regional Flood Control District and Pima County Wastewater Management Department (WWM) out of the 100 year flood plain and away from areas subject to erosion hazard. *{1985 Point Source Update}*
- All wastewater treatment plants must include an extensive public participation process, involving, but not limited to, the residents of the affected area. *{1985 Point Source Update}*
- All wastewater treatment plants must be based on a cost-effective analysis that substantiates the plant as the most viable method of serving the area in both the long and short term. A financing method must be provided, including local user fees if applicable. *{1985 Point Source Update}*

- All wastewater treatment plants must include an approved industrial pretreatment program if applicable. *{1985 Point Source Update}*
- All private wastewater treatment plants must have no adverse financial impact on the public, including impacts on previously financed treatment plants or conveyance facilities, and shall include connection fees and user charges should the service area be connected to the regional system. *{1985 Point Source Update}*
- All private wastewater treatment plants must have a design life of 25 years, with assurances (bonds, letters of receipt, or similar device) that the facility will be built, operated, maintained and repaired for its design life. *{1985 Point Source Update}*
- All private wastewater treatment plants must have an approved plan for service to the affected area throughout the design life and afterwards, including, if appropriate, plans for turnover of the facilities to Pima County WWM with payment of applicable fees. *{1985 Point Source Update}*
- All private wastewater treatment plants must have a plan for wastewater service to neighboring areas, including flow through conveyance capacity and easements, with sizing in accordance with a Basin Study, all approved by Pima County WWM. *{1985 Point Source Update}*
- All temporary plants must have a plan for transition to a permanent method of wastewater treatment, including financing arrangements that will not adversely affect the public. These arrangements must include payment of sewage connection fees and any other financing arrangements which Pima County WWM deems necessary for efficient service to the public. *{1985 Point Source Update}*
- All temporary plants must have a plan for wastewater service to neighboring areas, including flow through conveyance capacity and easements, with sizing in accordance with a Basin Study, all approved by Pima County WWM. *{1985 Point Source Update}*

3. PLANNING AREA DESCRIPTION

3.1. NATURAL SETTING

The natural setting in Pima County is diverse with respect to many parameters, especially elevation. Pima County is approximately 9,200 square miles in area, with land surface elevations ranging from 1,200 feet to more than 9,000 feet above mean sea level (PAG, 2003). The lower elevations of Pima County lie within the Sonoran Desert, which covers 86,000 square miles in southern Arizona, southeastern California, most of the Baja Peninsula and the Mexican state of Sonora (Nature Conservancy, 2005). Near Tucson, the Santa Catalina, Rincon, and Santa Rita Mountains are the highest mountain ranges in the county, with deciduous woodlands, coniferous forests and perennial streams. The wide elevation span leads to diverse climate regimes and ecosystems.

3.1.1. Planning area and watershed boundaries

Although PAG's DPA legally encompasses all of Pima County, the Tohono O'odham Nation opted to produce its own 208 Plan for its lands. Therefore, PAG's 208 Plan only addresses non-tribal lands including the City of Tucson, the Town of Oro Valley, the Town of Marana, the City of South Tucson, the Town of Sahuarita, and unincorporated Pima County, which includes Green Valley, Ajo and Summerhaven (Figure 3-1). Because the majority of the DPA falls within eastern Pima County (as well as the majority of the population, water resources, and wastewater treatment plants), it is the geographic focus of this chapter.

Watersheds in Pima County include large alluvial basins separated by mountain ranges. The Santa Cruz River watershed encompasses most of eastern Pima County, whereas a portion of the Lower Gila River watershed covers the western third of Pima County (Figure 3-1). The eastern Pima County drainage network generally runs north to northwest, while the western Pima County drainage network runs west to southwest. A portion of the Lower San Pedro River watershed is in the northeast corner of Pima County. All of Pima County ultimately drains to the Colorado River. The majority of the watercourses in Pima County are ephemeral, with some intermittent and perennial watercourses located in eastern Pima County.

Pima County intersects the ADEQ-defined Colorado-Lower Gila, Santa Cruz-Magdalena-Rio Sonoyta, and San Pedro-Wilcox Playa-Rio Yaqui watersheds. The following bulleted list and Figure 3-1 indicate which Hydrologic Unit Code (HUC) watersheds intersect Pima County.

COLORADO-LOWER GILA

- San Cristobal Wash
- Tenmile Wash

SANTA CRUZ-MAGDALENA-RIO SONOYTA

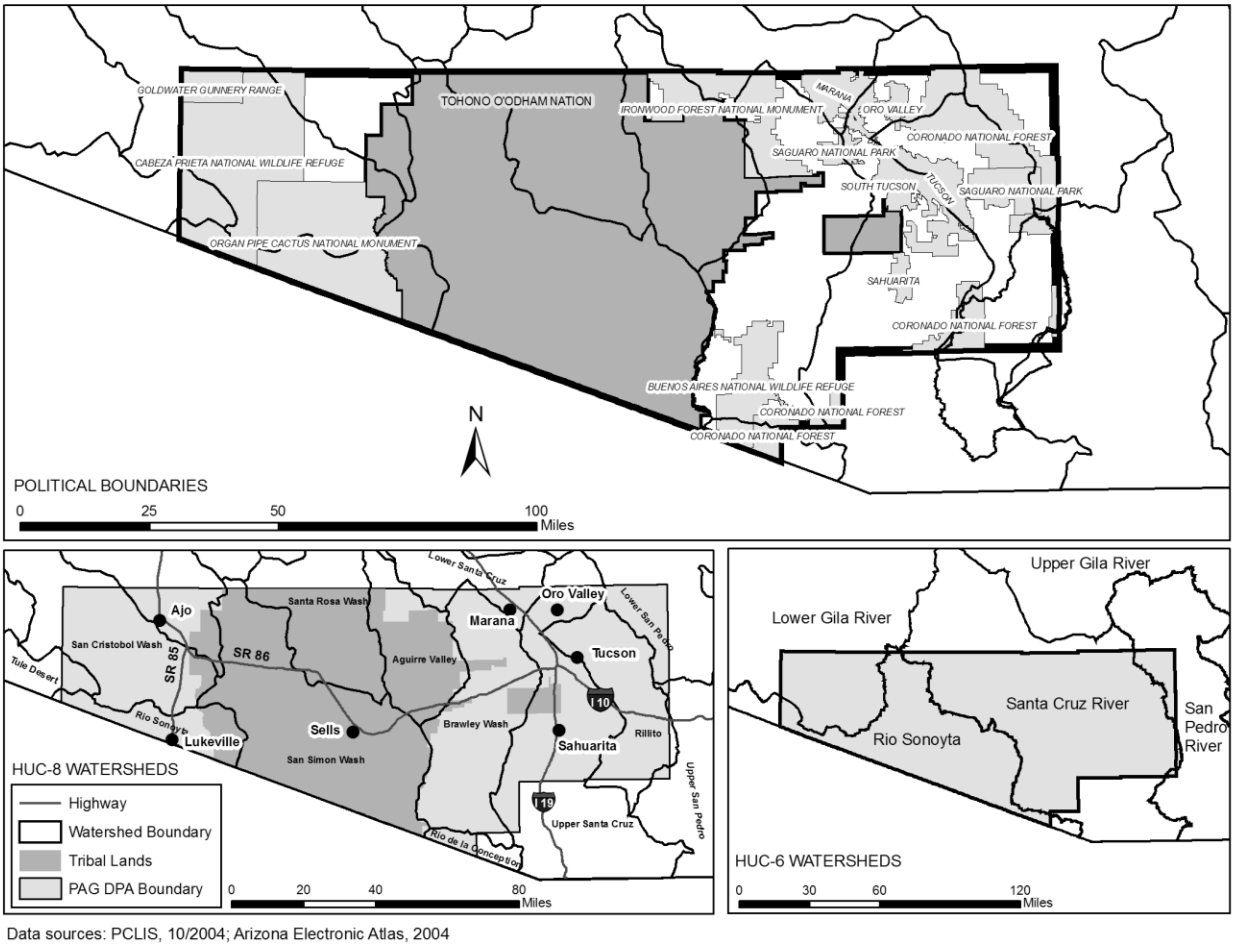
- Aguirre Valley
- Brawley Wash
- Rillito (also known as the Cienega Creek and Pantano)
- Lower Santa Cruz
- Rio de la Concepcion
- Rio Sonoyta

- San Simon Wash
- Santa Rosa Wash
- Tule Desert
- Upper Santa Cruz River

SAN PEDRO-WILCOX PLAYA-RIO YAQUI

- Lower San Pedro River
- Upper San Pedro River

Figure 3-1. PAG 208 Planning Area: Political and Watershed Boundaries



Data sources: PCLIS, 10/2004; Arizona Electronic Atlas, 2004

3.1.2. Climate

Southeastern Arizona is known for its low annual precipitation, clear skies, and year-round warm weather; however, climate variability is very pronounced in the Southwest, with relatively dry, wet, cool, and warm periods fluctuating on time scales from seasons to centuries due to changes in oceanic and atmospheric circulatory patterns (Sheppard et al., 1999). For example, the U.S. Southwest has been in an aggressive drought for the last five to seven years. Reservoir levels and stream flows are down, and some climatologists suggest that the U.S. Southwest has entered an abnormally dry period. According to paleoclimatology records, such

dry periods have occurred in the past, notably during the 1890s and the 1950s (Sheppard et al., 1999).

Seasonal precipitation patterns are evident in Pima County. Summer precipitation is due to intense, localized convective thunderstorms associated with the North American monsoon. Winter precipitation is due to the remnants of tropical storms or frontal storms that are tracking more southerly than usual. In both cases, winter precipitation tends to be in the form of widespread, soaking rains, with snow in the upper elevations. In the Santa Catalina Mountains, snowfalls averaged 75.37 inches per year between 1965 and 1980 (WRCC, 2004a). A quasi-permanent subtropical high-pressure ridge over the Southwest can be attributed for the warm and dry periods in between.

Between 1971 and 2000, summer (June - August) high temperatures averaged 99 degrees Fahrenheit (ºF), winter (December – February) high temperatures averaged 66.6 ºF, and annual precipitation averaged 12.19 inches in Tucson (WRCC, 2004).

3.1.3. Geology

Pima County is in the Basin and Range physiographic province, which extends from eastern California to central Utah and from southern Idaho to the Mexican state of Sonora. Characterized by northwest trending mountain ranges separated by alluvial valleys, the basin and range physiography was created by volcanic activity and normal faulting in areas where the earth's crust underwent lateral extension. Along the north/south trending faults, mountains uplifted and valleys down-dropped. Vertical relief between the valley floor and mountain peaks regularly exceeds 6,000 feet. Rock types in Pima County span from acidic volcanic and intrusive rocks to limestone, basalt, andesite and metamorphic schists (USGS, 2001).

Eroded sediments from the mountains created deep basins in the valleys. Basin units consist of (from oldest to youngest) mountain bedrock, moderately to highly consolidated pre-basin and range sediments, consolidated lower basin fill, less consolidated upper basin fill and unconsolidated stream alluvium (Anderson et al., 1990).

3.1.4. Hydrology

3.1.4.1. Groundwater hydrology

Most aquifers in Pima County exist in the unconsolidated units such as the Pleistocene Fort Lowell Formation in the Tucson basin and the upper Tinaja beds in the Avra Valley basin (Figure 3-2). Although large aquifers are laterally separated from each other by mountain piedmonts (Anderson et al., 1990), faults and fractures create vertical conduits between saturated units. Perched aquifers exist in some areas where a clayey layer acts as an aquitard between the main aquifer and the perched aquifer.

From youngest to oldest, the three sedimentary units in the Tucson basin are the Pleistocene Fort Lowell Formation, the Tertiary Tinaja beds, and the Tertiary Pantano Formation (Davidson, 1973). The saturated portion of the Fort Lowell Formation and the upper Tinaja beds compose the most productive part of the aquifer (CH2M Hill, 1988). The Fort Lowell Formation unconformably overlies the Tinaja beds, which consist of upper, middle, and lower units. The Tinaja beds range from a few feet thick near the edge of the basins to more than 5,000 feet thick near the center of the Tucson basin (Davidson, 1973). The Tinaja beds unconformably overlie the Pantano Formation. The thickness of the Pantano Formation is unknown, but may be thousands of feet thick in the Tucson basin (Anderson, 1987). Quaternary alluvial deposits

can be found in alluvial fans, terrace deposits and stream channels. Groundwater generally flows in a north to northwest trending direction, and exits the Tucson basin at the Rillito narrows (Davidson, 1973). The groundwater basins in Eastern Pima County are shown on Figure 3-2.

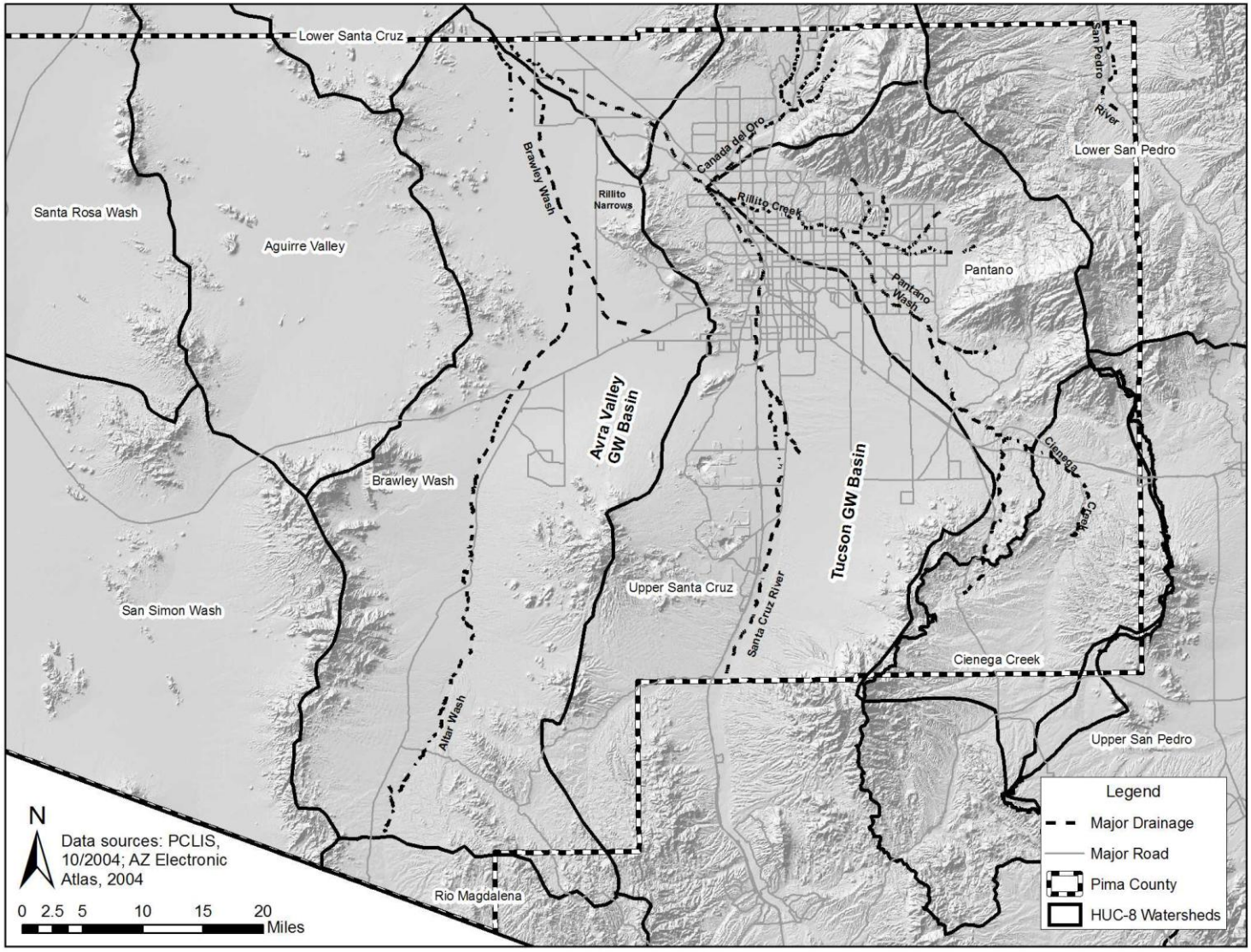
Primary inputs and outputs to the aquifer include recharge and groundwater withdrawal, respectively. Precipitation naturally recharges the aquifers through infiltration of streamflow, mountain front recharge and underflow. Recharge also occurs via anthropogenic projects. In the Tucson basin, groundwater pumpage since the mid-20th century has dewatered much of the shallow and highly unconsolidated portions of the quaternary alluvium and upper Fort Lowell Formation. Depths to water in the Tucson basin range from less than 20 feet to greater than 500 feet (Tucson Water, 2000).

3.1.4.2. Surface water hydrology

The Santa Cruz River originates in the San Rafael Valley, flows southward and enters Mexico. During its 25-mile course through Mexico, the river continues its southward flow for a short distance and then bends northward and enters Arizona five miles east of Nogales (ADWR, 1999a). From the International Border, the Santa Cruz River continues northward for 105 miles to the confluence of the Gila River (ADWR, 1999 and ADWR, 1999a). Mostly ephemeral, there are two effluent-dependent reaches downstream of Nogales, Arizona, and Tucson, Arizona. Significant tributaries to the Santa Cruz River include Cienega Creek, Pantano Wash, Rillito Creek, Julian Wash, Rincon Creek, Tanque Verde Wash, Sabino Creek, and Canada del Oro Wash. Brawley Wash is a tributary to the Lower Santa Cruz River (Figure 3-2).

The majority of surface water courses in Pima County are currently ephemeral, flowing only in response to runoff events. In a 2000 report, only 32 perennial streams were identified in Pima County (PAG, 2000a). Surface water sources are discussed in more detail later in this chapter.

Figure 3-2. Groundwater Basins in Eastern Pima County



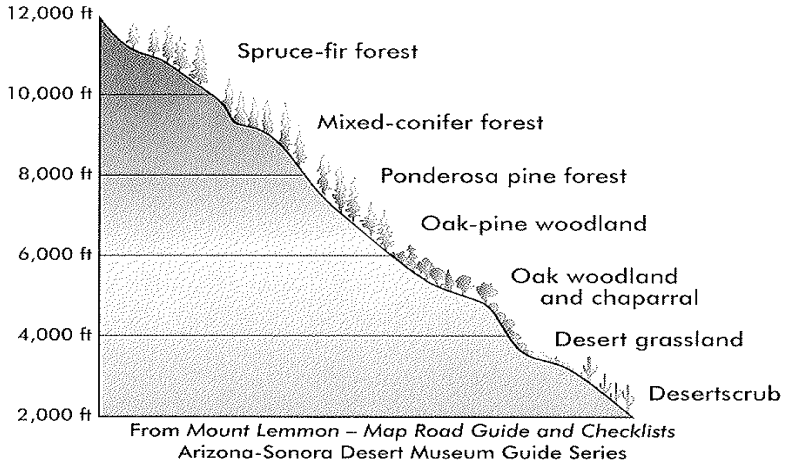
3.1.5. Biology

3.1.5.1. Vegetative communities and habitat

Categorized based on elevation ranges, there are six native vegetative communities in Pima County (Figure 3-3). Sonoran desert scrub and desert grasslands exist between 2,000 and 4,000 feet above mean sea level. Creosote bush, saltbrush, palo verde trees, saguaro and other succulents are present at this elevation range. Lower temperatures and increased precipitation in the mountains support mid-elevation oak and juniper woodlands, and at the highest elevations, coniferous forests (PAG, 2003).

Along riparian reaches, native cottonwood, willow, and velvet mesquite can be found. However, non-native species such as Lehmann lovegrass, salt cedar (tamarisk), Johnson grass, and giant reed are displacing native vegetation in riparian areas (PAG, 2003a) as well as in desert areas. Escaped landscape plants have been identified in wild areas (Pima County, 2002).

Figure 3-3. Major Vegetation Types



In addition to the proliferation of non-native vegetative species, habitat destruction stemming from other causes is also occurring. Urban growth in eastern Pima County, border traffic in western Pima County (Organ Pipe National Monument, 2004), recent upper elevation fires, and drought conditions have displaced animal and plant species. Over the last few years, fires of differing magnitudes have burned in the mountains surrounding Tucson, namely the 2003 Aspen Fire and 2002 Bullock Fire in the Santa Catalinas. Although natural events, fires can lead to increased sediment discharge, flood potential, and water quality changes in associated valleys (Woodhouse, 2004; Meixner and Wohlgemuth, 2004).

The Pima County Sonoran Desert Conservation Plan was developed in the early 2000s to mitigate habitat loss. It designates priority habitat areas for identified, vulnerable species and general biodiversity purposes, and directs urban growth into other areas. Priority habitat areas include the Altar Valley, Baboquivari Mountains, Cienega Creek, Eastern Tucson Riparian Complex, Organ Pipe/Goldwater Complex, Sabino Canyon, San Pedro River, Santa Rita Mountains, Silverbell Mountains, Tortolita Mountains and the Tucson Mountains (Pima County, 2004). The City of Tucson and Town of Marana are also developing habitat conservation plans. The local governments' habitat conservation efforts tend to focus on areas that serve as wildlife corridors to publicly protected lands such as national parks or forests and cover several aquatic and riparian-based ecosystems. The diverse vegetative communities present on mountain

ranges support a variety of vulnerable species and habitats, especially for animals with large home ranges. In addition, some of the last remaining perennial streams are located in the upper elevations.

3.1.5.2. Wildlife

The extensive elevation range in Pima County yields a diversity of animals and plants in the Sonoran Desert and surrounding mountains. Common year-round mammals include bobcats, javelinas and coyotes. Most native amphibians, reptiles (including many rattlesnakes), and rodents hibernate over the winter and emerge in the spring. Common Sonoran desert reptile species include the Gila monster, desert iguana, gopher snake and banded gecko. Native avian species include the cactus wren, Gila woodpecker, Gambel's quail, roadrunner and Harris hawk. Many species of butterflies, bats and birds migrate through the desert washes, riparian woodlands or pine forests between their wintering areas in the subtropics to their nesting areas. Over the last 30 years scientists observed that non-native aquatic species, such as bullfrogs, green sunfish, and crayfish have displaced native species such as leopard frogs, gila topminnow and gila chub.

3.1.5.3. Endangered species

As of 2002, there are 17 species on the U.S. Fish and Wildlife Service's (FWS) Endangered Species List, four species on the Threatened Species List, and three species on the Candidate List in Pima County (Table 3-1). According to the U.S. FWS (2004), species on the Endangered list are in danger of extinction throughout all or a significant portion or their range, species on the Threatened list are likely to become endangered in the foreseeable future, and species on the Candidate list are proposed for possible addition to the other two lists.

Table 3-1. Endangered and Threatened Species in Pima County (Pima County, 2002a)

Species Name (common)	*Endangered*	*Threatened*	*Candidate*
Acuna cactus			X
Bald eagle		X	
Cactus ferruginous pygmy-owl	X**		
Chiricahua leopard frog		X	
Desert pupfish	X		
Gila chub	X*		
Gila topminnow	X		
Huachuca water umbel	X		
Jaguar	X		
Jaguarundi	X		
Kearney's blue star	X		
Lesser long nosed bat	X		
Masked bobwhite	X		
Mexican gray wolf	X		
Mexican spotted owl		X	
Mountain plover		X*	
Nichol turk's head cactus	X		
Northern aplomado falcon	X		
Ocelot	X		
Pima pineapple cactus	X		
Sonoran pronghorn	X		
Sonoyta mud turtle			X
Southwestern willow flycatcher	X		
Western yellow-billed cuckoo			X

*Proposed listing **Recent court decisions indicate this species could be de-listed

The City of Tucson and the Town of Marana are in the process of developing Habitat Conservation Plans (HCP) to mitigate incidental takes of listed species. Pima County is also developing an HCP as part of the Sonoran Desert Conservation Plan.

3.1.5.4. Aquatic species in the Santa Cruz River watershed

There are several native aquatic species in the Santa Cruz River watershed. In general, many aquatic species are listed as vulnerable species in the Sonoran Desert Conservation Plan due to the decrease in perennial surface waters, most notably the Santa Cruz River and Rillito Creek. Native species include the Chiricahua leopard frog, Sonoran desert toad, Great Plains toad, Great Plains narrow-mouthed toad (Tucson Herpetological Society, 2004), Southwestern Woodhouse toad, narrow-mouthed toad, canyon tree frog, lowland leopard frog (PAG, 2001), longfin dace, desert sucker, Sonora sucker, desert pupfish, gila chub, gila topminnow, Quitobaquito pupfish, Sonoyta mud turtle, Tarahumara frog, and speckled dace (Pima County, 1999).

3.2. POPULATION

Almost all of the incorporated and many of the unincorporated areas of Pima County increased in population between 1980 and 2000, with the exception of the City of South Tucson. Between 1990 and 2000 the populations of Arizona and Pima County have grown by 39.9 percent and 26.5 percent respectively, to make Arizona the second fastest growing state in the nation. Based on 2000 Census data, the population of Pima County is approximately 840,000; the population of Tucson, the largest incorporated city, is approximately 490,000. The City of Tucson grew from 158 square miles to 225 square miles during this time frame, and the Towns of Oro Valley and Marana also annexed additional lands. The towns of Marana and Oro Valley were the fastest and second-fastest growing towns in Arizona in the 1990s. The town of Sahuarita was incorporated in 1994 with a population of 2,159. The Pascua Yaqui population living on the reservation was 3,315 in 2000 (PAG, 2003).

Table 3-2. Population Growth in Pima County – 1980 to 2000 (PAG, 2003)

Year	*Arizona*	*Pima County*	*Unincorporated Pima County*	*Tucson*	*South Tucson*	*Marana*	*Oro Valley*	*Sahuarita*
1980	2,716,546	531,443	191,179	330,537	6,554	1,674	1,489	*
1990	3,665,228	666,880	247,540	405,390	5,093	2,187	6,670	1,629*
2000	5,130,632	843,746	305,059	486,699	5,490	13,556	29,700	3,242
Change 1990-2000	1,465,404	176,866	57,519	81,309	397	11,369	23,030	1,613*
Percent Change 1990-2000	39.9%	26.5%	23.2%	20.1%	7.7%	519.8%	345.3%	99.0%*

* Sahuarita incorporated in 1994. 1990 population estimated from census tracts approximate to the incorporation limits of the town.

The 1978 208 Areawide Wastewater Management Plan accurately projected the actual Pima County population for 2000. It published a population range of 675,000 to 879,300 to use in projecting future wasteloads. The actual 2000 Pima County population was 843,746.

3.3. LOCAL GOVERNMENTS

There are eight local governments in Pima County: the City of Tucson, City of South Tucson, Pascua Yaqui Tribe, Tohono O'odham Nation, Town of Marana, Town of Oro Valley, Town of Sahuarita, and Pima County. Each jurisdiction is governed by an elected board (i.e., city or tribal council, board of supervisors), and the cities and towns also directly elect a mayor and appoint management staff. Department staff for publicly provided services (i.e., transportation, human resources, planning, police) are appointed in each jurisdiction. One elected official from each jurisdiction serves on the PAG Regional Council, which acts on regional transportation, environmental and planning issues.

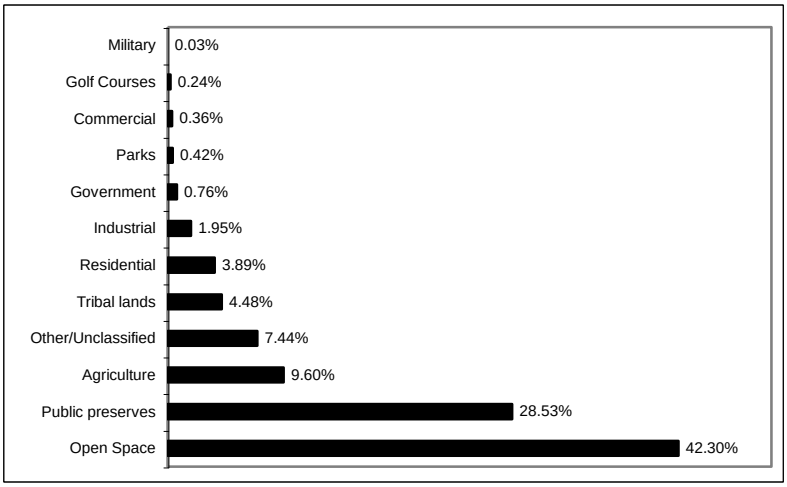
There are two Congressional Districts for the 108th Congress in Pima County, 7 and 8. Currently, Raúl M. Grijalva (D) is the U.S. Representative for District 7, and Jim Kolbe (R) is the U.S. Representative for District 8. Each was re-elected in November 2004 for two-year terms. There are six State Legislative Districts in Pima County: 25, 26, 27, 28, 29, and 30. There is one State Senator and two State Legislators elected per district to two-year terms.

In August 2004, legislation was passed to allow a Regional Transportation Authority (RTA) governed by the PAG Regional Council to plan and fund regional transportation projects in eastern Pima County. It also allows the RTA to propose an excise tax to voters and use the generated income, if approved, to fund approved projects. The excise tax is expected to be voted on in May 2006.

3.4. LAND USE / OWNERSHIP

Approximately 86 percent of Pima County consists of land owned by the federal and state governments and tribal nations. Tribal nations account for 42 percent of the total land area, primarily in central Pima County. The State of Arizona owns 15 percent, and the U.S. Government owns 29 percent, which consist of national parks, monuments, forests, wildlife refuges, and an Air Force range. Individual and corporate ownership account for the remaining 14 percent (PAG, 2003).

Figure 3-4. Land Uses in Eastern Pima County in 2002 (PAG, 2003)



Land uses in Pima County are diverse, with sometimes quite disparate land uses occurring in the same geographic area. In western Pima County, small, unincorporated communities and

open space cover the landscape. In contrast, eastern Pima County consists of urbanized areas, especially around the Tucson metropolitan area, croplands along the I-10 corridor from Marana to the southern outskirts of Phoenix, and open space and ranching in the southeastern, northeastern and eastern corners of the county. Incorporated areas in eastern Pima County continue to expand as open space and settled areas are annexed. Figure 3-4 indicates the land uses in eastern Pima County in 2002.

3.5. WATER RESOURCES

Five principal water resource categories are present in Pima County (Table 3-3). These are mapped on Figures 3-5.

Table 3-3. 2003 Water Resources in Eastern Pima County

Resource
Groundwater
Central Arizona Project (CAP) water
Treated wastewater
Surface water
Stormwater runoff

Coordinated planning and management of these water resources is necessary, because they are not always physically isolated from one another. For example, groundwater is the original source of most of the perennial and intermittent natural surface water sources in Pima County. Groundwater is also the original source for the treated wastewater that is discharged to the Santa Cruz River. Stormwater runoff recharges groundwater naturally, and CAP water is used to recharge groundwater artificially. Treated wastewater in the Santa Cruz River also recharges groundwater. Thus, in many instances the quality and quantity of one water source can affect the quality and quantity of another.

Although these resources can be hydrologically linked, they are not necessarily managed as such. For example, surface water use and groundwater use are treated as two separate entities by the legal method used to allocate surface water in the Western United States. In addition, water management tools consider groundwater, CAP water, and effluent as direct water resources, whereas harvested stormwater is not. Instead, it is factored into the net natural recharge of aquifers. Runoff that does not recharge groundwater is subject to surface water rights.

3.5.1. Groundwater

Historically, groundwater has been the most extensively used water resource in Pima County. Most of the groundwater development has occurred in eastern Pima County, in the Upper Santa Cruz Basin and Avra Valley. Groundwater in these areas is used for public drinking water supply, landscape and crop irrigation, and industry (including mining). Figure 3-5a shows the locations of all of the registered production wells in the Tucson AMA that are not exempt from reporting requirements. Throughout most of the county, groundwater is drawn from wells that tap deep aquifers found in the alluvial basins. Elsewhere, groundwater is drawn from shallow wells tapping comparatively localized sources, such as fractured bedrock, flood plain aquifers, or perched aquifers. Depths to groundwater in eastern Pima County currently range from less than 20 feet to greater than 500 feet below land surface (Tucson Water, 2000).

Groundwater pumpage totaled more than 316,000 acre-feet in 2003 in the Tucson AMA, which includes most of eastern Pima County and part of Pinal County (ADWR, 2004). This greatly exceeds the volume of groundwater recharge (ADWR, 2004), resulting in water-table declines of over 200 feet (Tucson Water, 1998) over decades. In 2003, it is estimated there was an overdraft of more than 100,000 acre-feet between aquifer gains (i.e., groundwater inflow and recharge) and aquifer losses (i.e., groundwater outflow, pumping, riparian evapotranspiration) (ADWR, 2004). In general, water level declines can lead to lower well productivity, increased pumping costs, declining water quality, and land subsidence (WRRC, 1999; WRRC, 2001). For these and other reasons, there is widespread interest in developing and using other renewable water sources instead of relying entirely on groundwater.

3.5.2. CAP water

Construction of the Central Arizona Project aqueduct started in 1973, and completed 20 years later south of Tucson. The CAP aqueduct is 336 miles long and transports Colorado River water from Lake Havasu to cities, towns, and farmers in central and southern Arizona, including Tucson. Some of the water is stored along the way in Lake Pleasant, which is impounded by the New Waddell Dam on the Agua Fria River northwest of Phoenix. CAP water allocations in Pima County are shown on Table 3-4.

Table 3-4. Central Arizona Project Contracts in the Tucson AMA (CAP, 2005)

A. Non-Indian Municipal and Industrial Subcontracts

Entity	*Annual Entitlement (acre-feet)*
Community Water Co. of Green Valley	1,337
Flowing Wells Irrigation District	4,354
Green Valley Domestic Water Improvement District	1,900
Metropolitan Domestic Water Improvement District	8,858
Spanish Trail Water Co.	3,037
Town of Marana	47
Town of Oro Valley	6,748
Tucson Water	135,966
Vail Water Co.	786
TOTAL	163,033

B. Indian Contracts

Entity	*Annual Entitlement (acre-feet)*
San Xavier (Tohono O'odham Nation)	27,000
Schuk Toak (Tohono O'odham Nation)	10,800
Pascua Yaqui	500
TOTAL	38,300

It has recently become a priority for CAP contractors in Arizona to use or store their full CAP allocations in underground storage facilities (USFs) or groundwater savings facilities (GSFs). USFs are constructed basins or natural streambeds where CAP water is allowed to percolate into the aquifer for current or future recovery, and GSFs are agreements between agricultural irrigators and CAP contractors to use CAP water for irrigation instead of groundwater. These facilities are designed to offset groundwater pumping elsewhere in the TAMA. There are four permitted USFs recharging CAP water and six permitted GSFs in the Tucson Active Management Area, as indicated on Table 3-5 and Figure 3-5b.

Figure 3-5a. Non-Exempt Water Production Wells in Eastern Pima County

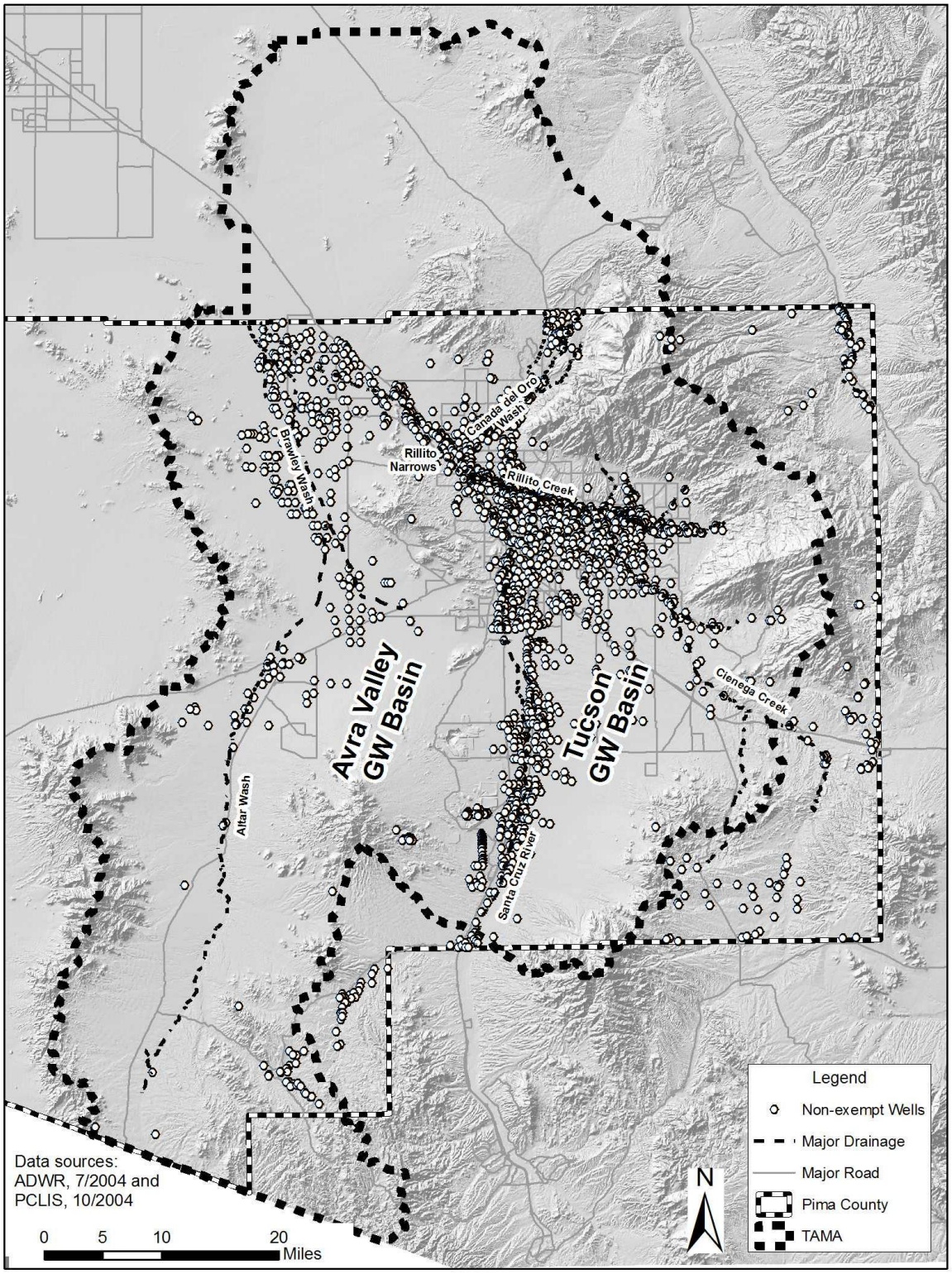


Figure 3-5b. CAP Water Resources in Eastern Pima County

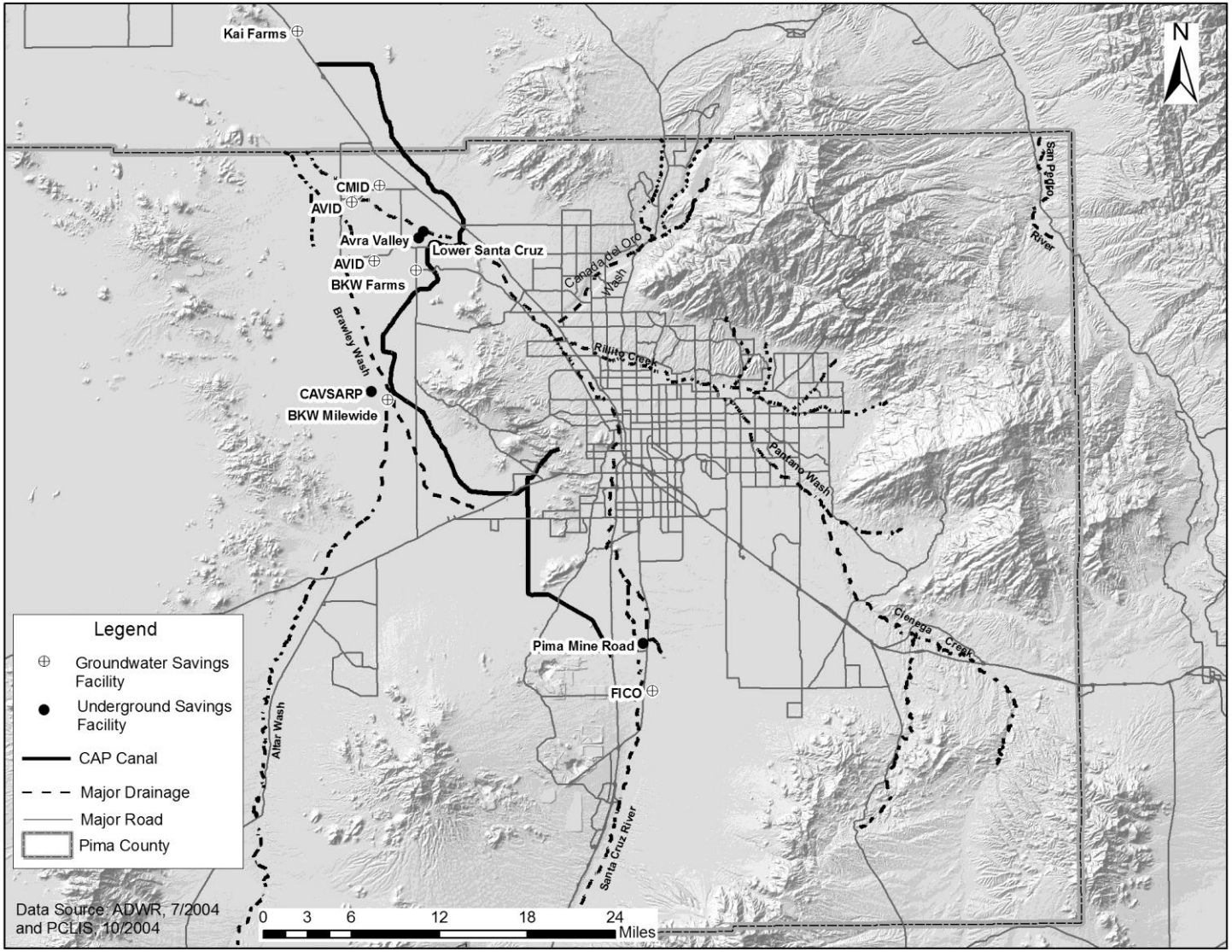


Table 3-5. Permitted USFs and GSFs Using CAP Water in the TAMA
(ADWR, 2003; Kusel, 2005)

Facility Name	*Facility Location*	*Facility Operator(s)*	*Organizations that are permitted to recharge at this facility*	*Permitted Annual Recharge Volume (acre-feet)*	*Cumulative Recharge through December 2003* (acre-feet)*
Lower Santa Cruz Replenishment Project (USF)	Northwest Tucson metro area, west of Tangerine and I-10	CAWCD, Pima County Flood Control District	CAWCD, AWBA, MDWID, Robson Communities, Town of Marana	50,000	108,455
Central Avra Valley Storage and Recovery Project (CAVSARP) (USF)	Avra Valley, west of Saguaro National Park West	City of Tucson	City of Tucson, AWBA	80,000	126,238.0
Avra Valley Recharge Project (USF)	Northwest Tucson metro area, NE of Avra Valley/Sanders Rd Intersection	CAWCD	CAWCD, MDWID, AWBA, Town of Marana	11,000	42,699.2
Pima Mine Road Full-Scale Recharge Project (USF)	South of Tucson metro area, between Santa Cruz River and Old Nogales Highway	CAWCD	CAWCD, City of Tucson, AWBA, Green Valley Water Co.	30,000	82,637.0
Cortaro Marana Irrigation District (GSF)	Western Marana	CMID, conveyed from CAWCD	CAWCD, City of Tucson, Spanish Trail Water Company, Community Water Company of Green Valley, MDWID, Town of Marana, Flowing Wells Irrigation District	20,000	59,347.0
BKW Farms (GSF)	Southwest Marana, near Twin Peaks and Sandario Rds	CAWCD	City of Tucson, AWBA, MDWID	~16,000	64,288.0
Kai Farms – Picacho (GSF)	Southern Pinal County, near Picacho Peak	Herb Kai	MDWID, CAWCD, Spanish Trail Water Company, Town of Oro Valley, City of Tucson, Vail Water Company, AWBA	~11,000	57,371.0

Facility Name	*Facility Location*	*Facility Operator(s)*	*Organizations that are permitted to recharge at this facility*	*Permitted Annual Recharge Volume (acre-feet)*	*Cumulative Recharge through December 2003* (acre-feet)*
Milewide/BKW Farms (GSF)	CAWCD	West of Saguaro National Park West	CAWCD, City of Tucson	~600	1,412.0
Avra Valley Irrigation District (GSF)	Herb Kai	Between Trico and Sanders Rds	MDWID, AWBA, City of Tucson	~12,500	0
Farmers Investment Company (GSF)	Farmers Investment Company	East of I-10/Sahuarita intersection	None	22,000	0

*Does not include the volume of water recovered (if any) from each facility.
*ADWR has not verified 2003 delivery volumes.

While many non-agricultural entities are storing water, Tucson Water is the only CAP contractor in the Tucson AMA currently recovering and using CAP water for potable supply. Through its Central Avra Valley Storage and Recovery Project (CAVSARP), which is a component of the Clearwater Project, Tucson Water recharges CAP water into groundwater basins, recovers the blended water through groundwater wells and distributes it.

3.5.3. Treated wastewater

Treated wastewater, also known as effluent, is used in several ways in Pima County in an effort to conserve groundwater and other potable supplies for uses that require higher quality water. It is used directly, recovered and treated from ongoing recharge projects, and also recharged without any ongoing associated wet-water recovery. Table 3-6 lists the wastewater treatment plants that are permitted to directly re-use effluent for landscape irrigation or construction dust control either onsite or within the associated service area.

Table 3-6. Effluent Use in Pima County (Source: Individual permits, ADEQ, 2005; Pima County WWM, 2002; Chavez, 2005)

Reuse Site/Provider	*Permitted use(s)*
Ina Road Treatment Plant/Tucson Water Service Area	Commercial and residential turf irrigation, agricultural irrigation. Construction dust control. Cooling towers. Public toilet flushing.
Roger Road WWTF	Turf and onsite irrigation
Green Valley Wastewater Treatment Facility/PC	Onsite irrigation
Marana Riparian Habitat Restoration Site/PC	Riparian landscape irrigation
Marana Publicly Owned Treatment Works/PC	Onsite construction dust control and irrigation

Avra Valley Wastewater Treatment Facility/PC	Onsite irrigation
UA Science and Technology Park/IBM Corp	Turf and landscape irrigation. Fire suppression. Toilet flushing. Onsite construction dust control.
Mt. Lemmon Wastewater Treatment Plant/PC	Spray irrigation

In addition to direct use, effluent is recharged into USFs at the Sweetwater Recharge Facilities, Santa Cruz River Managed Underground Storage Facility Project, Lower Santa Cruz River Managed Recharge Project, Marana High Plains Effluent Recharge Project, Robson Ranch Quail Creek, and the Lower Santa Cruz Recharge Project. Refer to Figure 3-5c for their locations. Tucson Water operates the Sweetwater Recharge Facilities on the west and east banks of the Lower Santa Cruz River. The U.S. Bureau of Reclamation and the City of Tucson jointly operate the Santa Cruz River Managed Underground Storage Facility, where effluent-dependent surface water is recharged in-channel to diverse riparian habitat along a river reach that would otherwise be ephemeral. The effluent originates from upstream wastewater treatment facilities. Marana High Plains is a pilot effluent recharge project located northwest of the Marana Airport. It is permitted to recharge up to 600 acre-feet of effluent-dependent surface water per year into off-channel constructed basins. Robson Ranch Quail Creek is located along the Upper Santa Cruz in the southern half of the Tucson AMA. It is permitted to recharge up to 2,240.3 acre-feet of effluent per year in basins. The Lower Santa Cruz River Managed Recharge Project is an in-channel recharge project permitted to recharge up to 43,000 acre-feet of effluent per year. Table 3-7 indicates the cumulative volume of effluent stored at each USF as of December 2003. In the Sweetwater Recharge Facilities entry, the reported volume does not reflect recovery volumes.

Table 3-7. Cumulative Effluent Recharge Volumes in Tucson AMA USFs, December 2003 (Kusel, 2005)

Recharge Facility	*Total Recharge Volume* (acre-feet)*
Sweetwater Recharge Facilities	50,121.9
Santa Cruz Managed	24,718.8
High Plains	277.4
Robson Quail Creek	103.5
Lower Santa Cruz Managed	2,074.5

*Does not include the volume of water recovered (if any) from each facility.
*ADWR has not verified 2003 delivery volumes.

Table 3-8 lists the entities and their rights to effluent that is discharged from the large, metropolitan wastewater treatment plants (i.e., Roger Road Wastewater Treatment Plant, Ina Road Water Pollution Control Facility and Randolph Park Wastewater Reclamation Facility), as outlined in the 2000 IGA between the City of Tucson and Pima County. Pima County and the City of Tucson are currently discussing the interpretation of the IGA with regard to the definition of what constitutes a metropolitan wastewater treatment plant. There have also been subsequent IGAs between the City of Tucson and other entities regarding effluent rights.

Figure 3-5c. Treated Wastewater Resources in Eastern Pima County

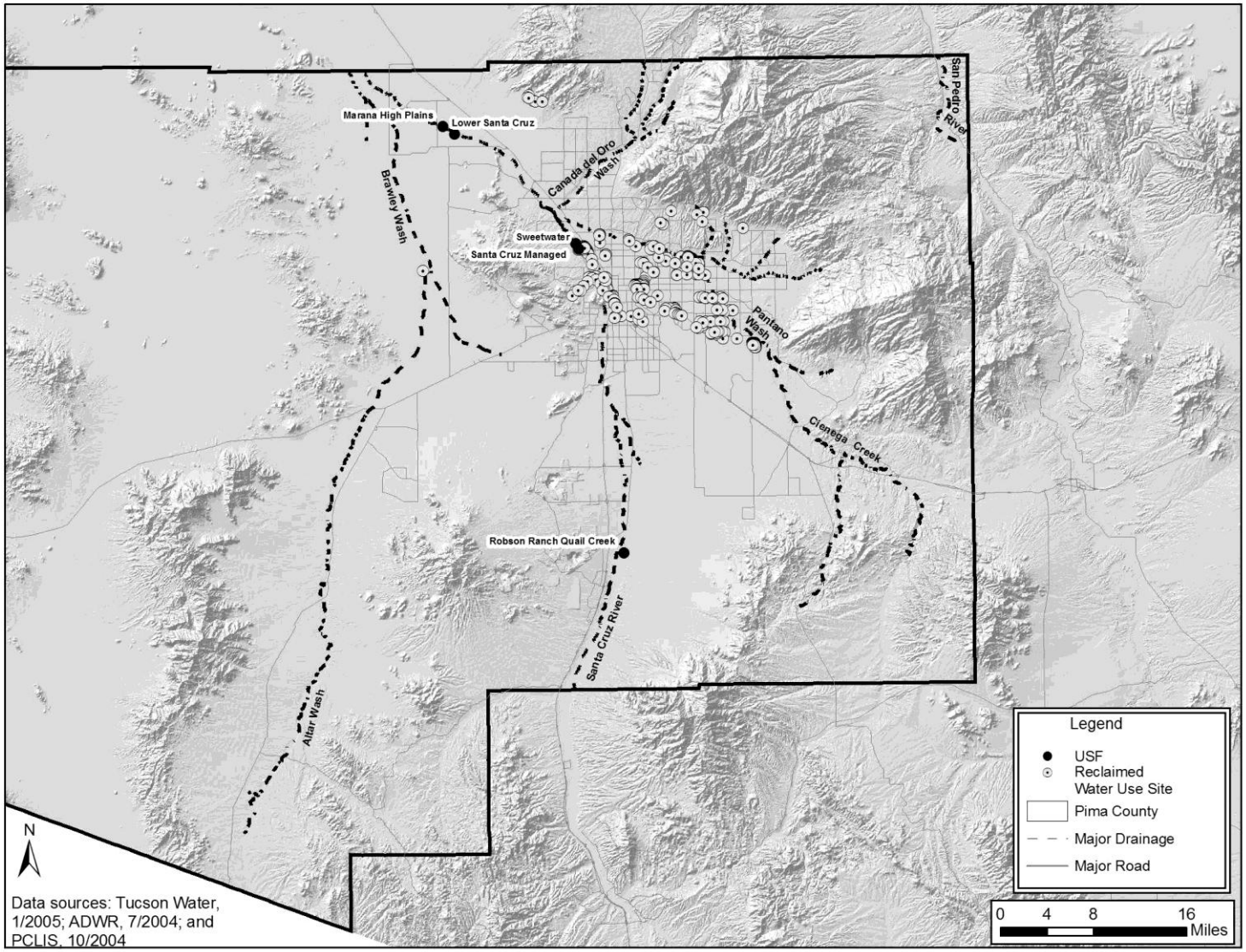


Table 3-8. Annual Effluent Rights to Wastewater Discharged from Tucson Metropolitan Wastewater Treatment Plants (City of Tucson and Pima County, 2000)

Entity	*Volume (acre-feet)*
Secretary of Interior (SAWRSA settlement)	28,200
Conservation Effluent Pool*	5,000
Pima County	10% of remaining effluent
Tucson Water	Remaining effluent

*Can increase to 10,000 acre-feet and above if negotiated.

Table 3-9 indicates the actual effluent distribution volume from metropolitan facilities in 2003, and the entities entitled to use it. Effluent produced by the metropolitan treatment plants that is not used directly or for recharge, is discharged into the Santa Cruz River.

Table 3-9. Local Effluent Entitlements in 2003 (Tucson Water, 2004)

Entity	*Volume (acre-feet)*
Tucson	30,739
Secretary of Interior	28,200
Pima County	3,986
Metropolitan Domestic Water Improvement District	3,074
Oro Valley	2,062
TOTAL Produced by metropolitan treatment plants	68,061

3.5.4. Surface water

There is currently very little perennial surface water in Pima County. The vast majority of the watercourses in Pima County are ephemeral, where flows consist solely of stormwater runoff. In contrast, the number of perennial[1] and intermittent[2] watercourses is relatively small, but the surface water in these water bodies is very important habitat for terrestrial and aquatic species.

The identified perennial and intermittent streams of Pima County are in a variety of locations and environments, and most are located in eastern Pima County as indicated in Figure 3-5d. Thirty-eight streams that had perennial or intermittent reaches had flows that originated in the Santa Catalina, Rincon or Santa Rita Mountains (PAG, 2000a). Forty-six perennial stream reaches and 97 intermittent stream reaches from a total of 86 different streams have been identified in Pima County.

Table 3-10. Perennial Streams in Pima County

Reach Name	*Reach Name*
Apache Spring	Montosa Canyon
Arivaca Creek	Nogales Spring
Bingham Cienega	Posta Quemada
Buehman Canyon (3 reaches)	Quitobaquito Spring
Bullock Canyon	Romero Canyon
Canada del Oro	Ruelas Canyon
Cienega Creek (9 reaches)	Sabino Creek (3 reaches)
Cinco Canyon	San Pedro River (2 reaches)
Davidson Canyon	Santa Cruz River

[1] A perennial stream is one that flows continuously, except possibly during times of severe drought.
[2] An intermittent stream is one that flows only at certain times of the year when it receives water from springs or from some surface source such as melting snow in mountainous areas.

Reach Name	*Reach Name*
Edgar Canyon	Scholefield Spring
Empire Gulch (2 reaches)	Simpson Spring
Espiritu Canyon (2 reaches)	Tanque Verde (upper)
Honey Bee Canyon	Wakefield Canyon (3 reaches)
Lemmon Creek	Wild Burro Canyon (4 reaches)
Little Nogales Spring	Wild Cow Spring
Mattie Canyon	Youtcy Canyon (2 reaches)

Two of the perennial stream reaches, Cienega Creek (from I-10 to the USGS gauge station at Pantano Wash) and Buehman Canyon (from headwaters, 9.8 miles downstream), are classified as "Unique Waters" by ADEQ, which means they are outstanding state resource waters and subject to stricter water quality regulations. Both reaches are indicated on Figure 3-5d. Downstream of the Unique Waters reach of Cienega Creek, water is diverted for golf course turf irrigation.

Table 3-11. Intermittent Streams in Pima County

Reach Name	*Reach Name*
Agua Caliente Wash	La Milagrosa Canyon
Agua Verde Creek	Madera Canyon
Alder Canyon	Madrona Canyon
Arivaca Creek (2 reaches)	Mattie Canyon
Ash Creek	Miller Creek
Atchley Canyon	Molino Canyon
Barrel Canyon	Mud Spring Canyon
Batamote Wash	Oro Blanco Wash
Bear Canyon (2 reaches)	Paige Creek (2 reaches)
Bear Creek	Palisade Canyon Creek
Bear Grass Tank	Peck Basin
Bolt Canyon	Pima Canyon
Bootlegger Spring	Rincon Creek
Box Canyon (Rincon)	Romero Canyon (2 reaches)
Brown Canyon	Rose Canyon Creek
Buehman Canyon (2 reaches)	Sabino Canyon
Bullock Canyon (3 reaches)	San Luis Wash
Canada Agua Canyon	San Pedro River (3 reaches)
Canada del Oro	Santa Cruz River (2 reaches)
Cargodera Canyon	Shaw Canyon
Chiminea Canyon	Smitty Spring
Chimney Canyon	Soldier Canyon
Cienega Creek (8 reaches)	Sutherland Wash
Davidson Canyon (3 reaches)	Sycamore Canyon
Deer Creek	Tanque Verde Creek (5 reaches)
Distillery Canyon	Thomas Canyon
East Fork Sabino Canyon	Turkey Creek
Enchanted Hills Wash	Unnamed Spring

Reach Name	*Reach Name*
Espiritu Canyon	Unnamed Spring
Finger Rock Canyon	Unnamed Springs
Fish Canyon	Unnamed tributary to Ash Creek
Florida Canyon	Ventana Canyon (3 reaches)
Gardner Canyon	Wakefield Canyon (2 reaches)
Geesaman Wash	West Fork Sabino Creek
Kings Canyon	Youtcy Canyon (2 reaches)

The primary surface water drainage in eastern Pima County is the Santa Cruz River. The river, which is approximately 60 miles long within Pima County, flows north through the Upper Santa Cruz Valley Subbasin and then northwest into the Avra Valley Subbasin. The river is mostly ephemeral in Pima County (ADWR, 1999).

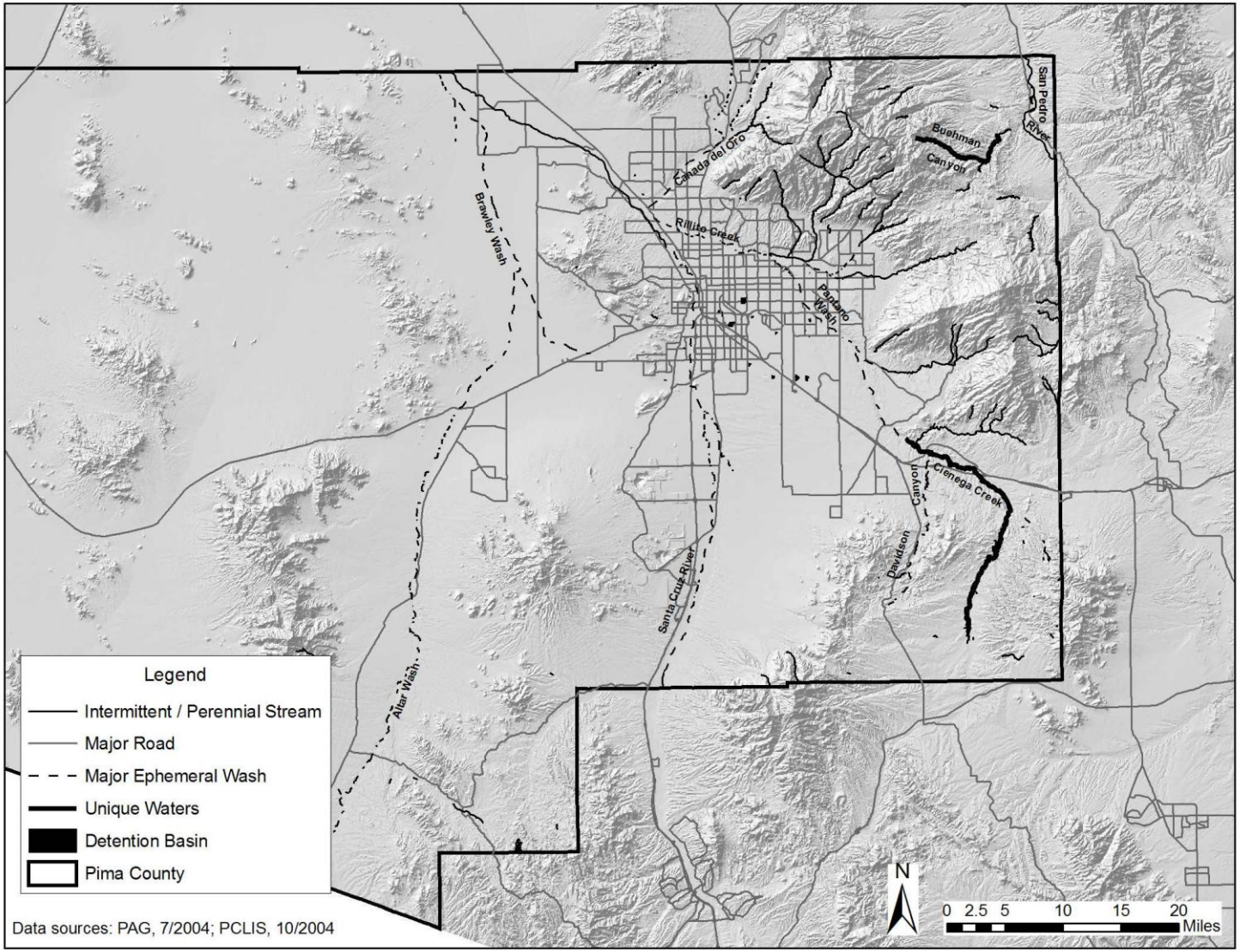
Major tributaries of the Santa Cruz River in the Upper Santa Cruz Valley Subbasin include the Canada del Oro, which drains the northern part of the Upper Santa Cruz Valley Subbasin, and Rillito Creek and its tributaries, which drain the area north and east of Tucson. Tributaries to Rillito Creek include Pantano Wash and Tanque Verde Creek. Pantano Wash receives flow from Rincon Creek and Cienega Creek. Tanque Verde Creek receives flow from Sabino Creek. In the Avra Valley Subbasin, Altar Wash originates in the southern part of the valley and flows north to become Brawley Wash. Brawley Wash flows to the north and northwest through Avra Valley to its confluence with the Santa Cruz River southwest of Red Rock.

The San Pedro River is a tributary of the Gila River and drains 4,485 square miles of Arizona and Mexico. The San Pedro River enters the northeastern corner of Pima County in what is considered the Lower San Pedro Basin. The river is fed by flow from the northeast side of the Santa Catalina Mountains and by two significant drainages from the Galiuro Mountains. Most of the stream reaches on the San Pedro are intermittent, but in the area around Bingham Cienega there is perennial flow (Royayne and Maddock III, 1996).

Tributaries to the Lower Gila River flow south to north to drain the western third of Pima County. These include Alamo Wash, Cherioni Wash, Chico Shunie Arroyo, Cuerda de Lena, Daniels Arroyo, Darby Arroyo, Gibson Arroyo, Growler Wash, Gunsight Wash, Kuakatch Wash, Rio Cornez, San Cristobal Wash, Sikort Chuapo Wash, and Tenmile Wash.

The San Simon Wash watershed drains the Tohono O'odham Nation, and runs northeast to southwest.

Figure 3-5d. Surface Water Resources in Eastern Pima County

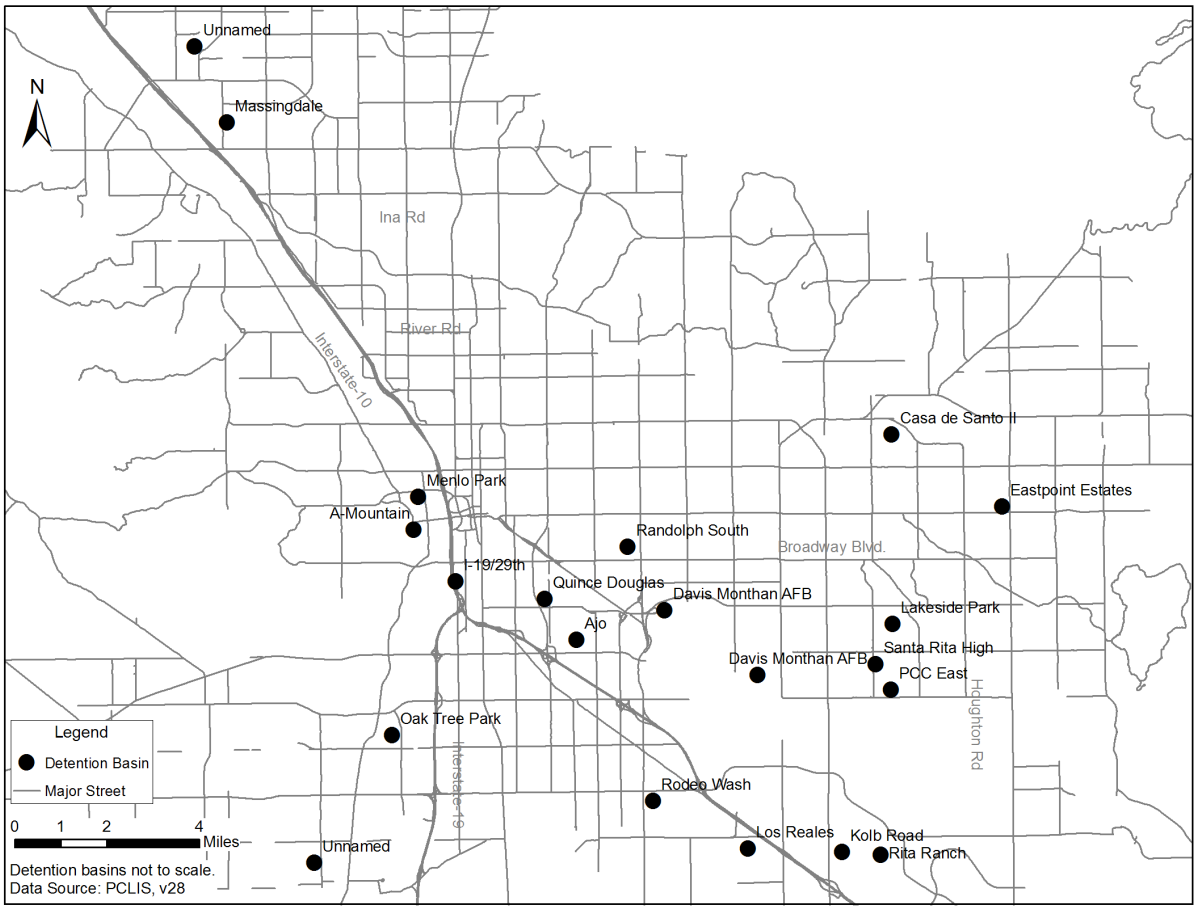


3.5.5. Stormwater runoff

Overland flow from winter precipitation events is an important source of recharge to the aquifers in Pima County. Groundwater conditions can be greatly affected by occasionally large overland flow events in the Santa Cruz River and its tributaries. Surface water flows recharge the shallow groundwater system as water infiltrates through stream channel sediments to the underlying aquifer. Stream channel recharge in the Upper Santa Cruz Valley Subbasin is estimated at 31,000 acre-feet per year and in the Avra Valley Subbasin at approximately 6,700 acre-feet per year (ADWR, 1999).

In addition to aquifer recharge, stormwater serves other purposes as well. It supports riparian vegetation along washes, and can support aquatic habitats in retention basins. For example, the Ajo Detention Basin recently has been reconfigured to utilize stormwater for onsite turf irrigation and wetland habitat. The City of Tucson and Pima County maintain several other detention basins, as indicated on Figure 3-5e. In addition, stormwater has been considered a potential source water for artificial groundwater recharge projects in Pima County. Since 1999, the City of Tucson Land Use Code requires rainwater harvesting to supplement outdoor irrigation for new and expanding commercial developments and City projects (City of Tucson, 2004).

Figure 3-5e. Stormwater Detention Basins in Eastern Pima County



3.6. WATER QUALITY

3.6.1. Groundwater quality

In general, groundwater in the Tucson AMA is of acceptable quality for most uses. In most cases, the minimum detectable level of a constituent is well below the U.S. EPA's regulatory limit for that constituent (Tucson Water, 2000a). A review of water quality data from Pima County drinking water providers for the 1998-2000 sampling years indicated the most common regulated constituents detected were nitrate, fluoride, arsenic and chromium (PAG, 2002a). Though these constituents were detected in drinking water supplies, none were seen at levels that exceeded the established drinking water maximum contaminant levels (MCL). Groundwater withdrawals from wells within these identified areas have been discontinued or are in the process of remediation. Other areas of known contamination not currently under remediation are monitored to ensure that contaminants do not spread (ADWR, 1999).

3.6.1.1. Water quality data from water providers and other sources

Most existing groundwater quality data for Pima County is representative of eastern Pima County, because more groundwater development has occurred there. Concentrations of selected constituents in eastern Pima County groundwater are shown on Table 3-12. The data are from Tucson Water's wellfields, which encompass large areas of the Tucson and Avra Valley basins. Groundwater quality data from the Upper Santa Cruz River basin are on Table 3-13.

Table 3-12. Concentrations of Selected Constituents In Tucson-Area Groundwater, 2003-2004 (Tucson Water, 2004a)

Parameter	*Tucson Supply Source*				
	Clearwater	*Avra Valley Wells*	*Santa Cruz Wells*	*Central Wells*	*South Side / TARP*
Fluoride, mg/L F	0.52	0.41	0.85	0.26	0.61
Hardness, mg/L CaCO3	119	77	216	125	175
Nitrate as Nitrogen, mg/L N	1.34	1.91	4.02	1.92	2.03
Sodium, mg/L Na	50	37	46	37	57
Total Dissolved Solids (TDS), mg/L	298	209	435	305	In Progress
pH, Std. Units	7.79	7.69	7.45	7.49	7.76

"In Progress" indicates that the data is under development and will be included on the table as the data becomes available.

Table 3-13. Upper Santa Cruz Basin Groundwater Quality Data Summary (PAG, 2002)

Constituent	*No. of Samples*	*Maximum*	*Minimum*	*Mean*	*No. Exceeding Standard*[1]
TDS (mg/L)	65	2000	170	580	30 (*500 mg/L)
Sulfate (mg/L)	70	1100	3.5	230	13 (*250 mg/L)
Nitrate (mg/L)	76	20	ND	4.4 [2]	7 (10 mg/L as N)
Arsenic (mg/L)	49	0.046	ND	n/a [3]	10 (0.01 mg/L) [4]
Hardness (mg/L)	67	1317	27	283	(no standard)

[1] National Primary and Secondary Drinking Water Standards are shown in parentheses. Secondary standards are unenforceable guidelines and are noted with an *.
[2] Calculation of mean included one non-detect treated as zero mg/L.
[3] Mean not calculated due to numerous non-detect values and varying minimum detection levels.
[4] Standard is not in effect yet.

Arsenic in groundwater in the Tucson Water well fields was measured during 2000. Six of the 162 points of entry (POE) tested had maximum arsenic concentrations greater than or equal to 9.0 μg/l, with the highest maximum value of 24 μg/l found at one site. Fifty-six of the POEs had maximum arsenic values of less than 2.0 μg/l (Tucson Water, 2004b). Public water systems must comply with a new arsenic drinking water standard of 10 μg/l beginning January 23, 2006

In the 1970s and 1980s groundwater studies were conducted in western Pima County by the USGS (Carruth, 1996). Samples from three groundwater sources, Bonita Well, Pozo Salado Well, and Quitobaquito Spring, all located within the Organ Pipe Cactus National Monument, indicated that the major-ion chemistry is similar to chemistry of groundwater in other alluvial basins in southern Arizona (Robertson, 1991). The upgradient well, Bonita Well, had dissolved solids measured at 338 mg/L and fluoride at 0.4 mg/L. Readings for pH ranged from 7.4 in the upgradient well to 8.4 in the downgradient well. Dissolved solids and fluoride also increased from the upgradient well to the downgradient site and ranged from 338 mg/L to 1,500 mg/L and 0.4 mg/L to 5.4 mg/L respectively (Carruth, 1996).

3.6.1.2. Areas of groundwater quality degradation

Land uses that have reportedly led to historic groundwater contamination in eastern Pima County include landfills and disturbed areas, irrigated agriculture, animal impoundments, underground storage tanks, surface impoundments, wastewater treatment facilities, mines, and industry and commerce (PAG, 1994a). Common groundwater contaminants in Tucson area groundwater include volatile organic compounds (VOC), nitrates, petroleum hydrocarbons, and heavy metals.

Federal and state programs have been established to remediate contaminated groundwater and soil.

3.6.1.2.1. Federal Superfund/CERCLA sites

The Tucson International Airport Area (TIAA) is the only federal Superfund site in Pima County. It was listed in 1983. The TIAA project is made up of several smaller projects, including the Raytheon/Air Force Plant 44, Tucson Airport Remediation Project (TARP), Airport Property Soils and Shallow Groundwater Zone, Arizona Air National Guard 162nd, Texas Instruments (formerly Burr-Brown), West Cap Property, and the West Plume B (ADEQ, 2004b). Groundwater in the area is primarily contaminated with trichloroethylene (TCE). Other contaminants include tetrachloroethylene (PCE), dichloroethylene (1,1-DCE), chloroform, benzene and chromium (EPA, 2004). Several pump and treat remediation systems has been in operation, and have cumulatively removed approximately 25,000 pounds of VOCs as of September 2004 (EPA, 2004).

3.6.1.2.2. State WQARF sites

The Arizona Water Quality Assurance Revolving Fund (WQARF) was created under the Environmental Quality Act of 1986 to support hazardous substance cleanup efforts in the state. ADEQ identifies sites that are most in need of cleanup and adds them to the WQARF Registry. Sites on the Registry receive first consideration for distribution of funds for water quality monitoring, health and risk assessment studies and remediating hazardous substances that may impact state waters. There are several groundwater and subsurface contamination sites in Pima County that are currently monitored or remediated under the State WQARF program. The following table details WQARF sites in Pima County. Soil and groundwater monitoring is ongoing at all of the WQARF sites.

Table 3-14. WQARF Sites in Pima County (ADEQ, 2004b)

Site	*Location*	*Registry Date*	*Primary Contaminants*	*Contaminant Sources/Land Use*	*Remedial Actions*
7th Street and Arizona Avenue	Downtown Tucson	2000	PCE, TCE, cis-1,2-dichloroethene (cis-1,2-DCE)	Former solvent, heating oil, waste oil USTs; former dry cleaning business (1957-1989)	Site assessments
Broadway-Pantano	East-Central Tucson	1998	PCE, TCE, cis-1,2-dichloroethene, vinyl chloride, and methylene chloride, arsenic	Former municipal landfill (1960-1971), buried metal waste	Soil vapor extraction system, fenced off dross site, pump and treat with granular activated carbon and reinjection
El Camino del Cerro	Northwest Tucson	1998	PCE, TCE, 1,1-dichloroethene (1,1-DCE), vinyl chloride, and benzene	Former municipal landfill, former oil recycling plant	Landfill gas extraction systems
Los Reales Landfill	Southeast Tucson	1999	PCE, TCE	Active municipal landfill	Pump and treat via air stripping, soil vapor extraction, use of landfill gas as TEP energy source, reinjection and reuse of treated water
Miracle Mile	West Tucson	1998	TCE, chromium	Unknown	Site assessment, remedial system design
Park-Euclid	Downtown Tucson	1999	Diesel free product, PCE, TCE, cis-1,2-DCE	Dry cleaning facilities	Soil vapor extraction
Shannon Road-Rillito Creek	West Tucson	1999	PCE and other VOCs	Possibly former landfill (El Camino del Cerro)	Wellhead treatment, on-going site assessments
Silverbell Landfill	West Tucson	1999	PCE, TCE, cis-1,2-DCE, vinyl chloride	Former landfill (1966-1977)	Air injection, soil vapor extraction

3.6.1.2.3. Other areas

In addition to the above sites, there are a number of sites where land uses have impacted the local groundwater. For example, groundwater under downtown Tucson is contaminated with diesel fuel (PAG, 1992). Also, an area encompassing 42 square miles in the upper Santa Cruz River area, which extends from two miles south of the Tucson City limit to just north of Green Valley, contains seven public supply wells that have exceeded the MCL for nitrate. Historical data indicate the high nitrate concentrations in this area occurred between the late 1940s and the mid-1960s, apparently as a result of irrigated agriculture, sewage effluent, septic tanks and animal feed lots (PAG, 1992). Sampling conducted between 1997 and 2002 indicated high

TDS, sulfate, and hardness concentrations near tailings ponds associated with mining activities southwest of the Tucson metropolitan area (PAG, 2002). Groundwater and soil contamination at the Davis Monthan Air Force Base results from a 1985 jet fuel spill. A soil vapor extraction system was installed in 1994, and continues to remove VOCs. Soil and groundwater monitoring is on going at the on-site former landfill and at the off-site former Titan Missile Silo (ADEQ, 2004c).

3.6.2. CAP water quality

The CAP water delivered to the Tucson area is a mixture of mostly water from the Colorado River, with some water from the Bill Williams River and the Agua Fria River. It is a sodium-sulfate water type meeting all primary drinking water standards established by the EPA and ADEQ with the exception of turbidity and total coliform bacteria (Tucson Water, 2000b). Analytical results for common constituents for all CAP water samples collected at the pump station at the CAP aqueduct (Tucson Water sample point 713) between October 1997 and April 2000 are summarized on Table 3-15. The data were collected by Tucson Water, which conducts extensive monitoring of CAP water delivered to CAVSARP.

Table 3-15. Summary of Water Quality for Untreated CAP Water at the Clearwater Site, October 1997-April 2000 (Tucson Water, 2000b)

Constituent	*Mean*	*Std. Dev.*	*Min.*	*Max.*	*MCL*	*No. of samples*
Calcium (mg/L)	66	4.53	56	75	-	14
Magnesium (mg/L)	28	3.05	26	38	-	14
Potassium (mg/L)	5.0	0.76	4.5	7.5	-	14
Sodium (mg/L)	92	12.8	85	135	-	14
Bicarbonate* (mg/L)	133	24.4	70	156	-	18
Bromide (mg/L)	@0.015	0.041	<0.1	0.14	-	13
Chloride (mg/L)	82	13.2	72	123	-	13
Sulfate (mg/L)	248	30.5	227	348	-	13
Nitrate (as Nitrogen) (mg/L)	@0.0077	0.0277	<0.025	0.1	10	13
Fluoride (mg/L)	0.313	0.051	0.24	0.44	4	13
Orthophosphate (as Phosphorus) (mg/L)	<0.3	0	<0.3	<0.3	-	11
Bicarbonate alkalinity (as mg/L $CaCO_3$)	109	20	57	128	-	18
Total Alkalinity, calculated (as mg/L $CaCO_3$)	129	16.6	84	148	-	11
TDS (mg/L)	603	48	566	712	-	14
Hardness, calculated (as $CaCO_3$)	280	12.6	261	303	-	13
pH	8.34	0.43	7.70	9.37	-	16
Electrical Conductivity at field temp (µmho/cm)	949	58.6	880	1010	-	4
Temperature (Celsius)	22.6	5.1	10.6	32.1	-	16
Aluminum (mg/L)	<0.1	0	<0.1	<0.1	-	5
Arsenic (mg/L)	@0.0023	0.0015	<0.002	0.0057	0.05	14
Barium (mg/L)	0.105	0.0102	0.095	0.13	2	14
Boron (mg/L)	0.131	0.0213	0.12	0.2	-	14
Iron (mg/L)	@0.072	0.120	<0.02	0.38	-	9
Lead (mg/L)	@0.0051	0.017	<0.002	0.064	0.015	14
Selenium (mg/L)	<0.005	0	<0.005	<0.005	0.05	12
Silicon (mg/L)	3.9	0.71	2.5	5.2	-	13

Constituent	*Mean*	*Std. Dev.*	*Min.*	*Max.*	*MCL*	*No. of samples*
Zinc (mg/L)	@0.052	0.093	<0.02	0.31	-	10
Total Trihalomethane (ug/L)	<0.5	0	<0.5	<0.5	100	17
Haloacetic acids (ug/L)	<3	0	<3	<3		5
Total Coliform MPN-CFU/100mL	@60	101	<2	300	-	8
TOC (ug/L)	3.3	0.32	2.7	3.81	-	18
Radon (pCi/l)	<22	-	<22	<22	-	1
Perchlorate (ug/L)	@0.0066	0.005	<0.004	0.014	-	6

Source: Sample point 713 (CAP Aqueduct M.P. 308.175)
*Bicarbonate concentration- 1.22 times the results of bicarbonate alkalinity reported above.
µmho/cm- micromhos per centimeter
MPN/100 ml- most probable method; results given in colony forming units (CFU) per 100 milliliters
< less than; constituent not detected above the laboratory reporting limit
@- Constituent was not detected above the laboratory reporting limit in some or all of the samples included in calculation

CAP water quality is also monitored at the Pima Mine Road Recharge Project. Analytical results of the source water samples did not indicate the presence of any analyte at concentrations exceeding the Arizona Aquifer Water Quality Standards (AWQS). No pesticides or herbicides were detected above the laboratory reporting limits. Results of the general minerals, and physical parameters (except temperature), were remarkably consistent among the three sampling periods conducted in 2000 (CAWCD, 2001). Results of the source water samples for mineral and physical parameters are shown on Table 3-16.

Table 3-16. Pima Mine Road Recharge Project Source Water Quality Monitoring Results (CAWCD, 2001)

Parameter	*Units*	*AWQS limit*	*01/06/2000 Results*	*03/03/2000 Results*	*10/19/2000 Results*
Alkalinity, total	mg/L		109	110	104
Alkalinity, Bicarbonate	mg/L		133	133	126
Alkalinity, Carbonate	mg/L		0.864	1.72	1.30
Chloride	mg/L		76.3	72.2	88.7
Fluoride	mg/L	4	0.32	0.31	0.36
Nitrate (as N)	mg/L	10	ND	ND	ND
pH	Std unit		8.0	8.3	8.2
Specific Conductance	Us/cm		915	855	905
Sulfate	mg/L		253	236	267
Total Dissolved Solids	mg/L		530	530	650
Temp (field)	°F		65.5	74.1	nm
Aluminum, dissolved	mg/L		ND	ND	ND
Antimony, dissolved	mg/L	0.006	ND	ND	ND
Arsenic, dissolved	mg/L	0.05	0.0045	0.0025	0.004
Barium, dissolved	mg/L	2	0.066	0.091	0.105
Beryllium, dissolved	mg/L	0.004	ND	ND	ND
Cadmium, dissolved	mg/L	0.005	ND	ND	ND
Calcium	mg/L		120*	68	62
Chromium, dissolved	mg/L	0.1	ND	0.0041	ND
Copper, dissolved	mg/L		ND	0.0037	0.021
Iron, dissolved	mg/L		ND	ND	ND
Lead, dissolved	mg/L	0.05	0.019	ND	0.66
Magnesium	mg/L		18.1*	29	31
Mercury, dissolved	mg/L	0.002	ND	ND	ND

Parameter	*Units*	*AWQS limit*	*01/06/2000 Results*	*03/03/2000 Results*	*10/19/2000 Results*
Nickel, dissolved	mg/L	0.1	ND	0.005	ND
Potassium	mg/L		3.5*	4.1	5.5
Selenium, dissolved	mg/L	0.05	ND	ND	ND
Silver, dissolved	mg/L		ND	ND	ND
Sodium, dissolved	mg/L		51.5*	84	100
Thallium, dissolved	mg/L	0.002	ND	ND	ND
Zinc, dissolved	mg/L		0.14	0.015	0.088
TOC	mg/L		0.9	2.8	3

nm=not measured

* results are questionable for these analytes, laboratory results appear to have been switched with another sample but could not be confirmed by the laboratory.

3.6.3. Treated wastewater quality

The Roger Road Wastewater Treatment Facility and the Ina Road Water Pollution Control Facility (WPCF) are required to monitor wastewater discharge (i.e., secondary effluent) for a number of parameters to comply with NPDES (1999) and Aquifer Protection Permits (2001). The data collected from the County's monitoring have been summarized in several previous studies, including those by PAG (1994, 1996) and Malcolm Pirnie (1994). In addition, more recent monitoring data included on Tables 3-17 and 3-18 indicate that the effluent water quality is well within the current NPDES and APP permit limits.

Table 3-17. Roger Road Wastewater Treatment Facility Discharge Monitoring Report, 2000 (Pima County WWM, 2001)

*Constituent (Units)**	*Permit Limit*	*1st Quarter Averages Jan- Mar*	*2nd Quarter Averages Apr-June*	*3rd Quarter Averages July-Sept*	*4th Quarter Averages Oct-Dec*
Flow (MGD)	Up to 41	26.3	23.2	28.0	29.2
Suspended Solids (Kg/day)	4,654	2,217	2,090	1,470	2,247
Suspended Solids (mg/L)	45	25	30	16	23.5
Fecal Coliform (#/100ml)	200	4	16	35	12
pH	6.5 - 9.0	7.6	7.6	7.6	7.6
Disinfectant Residual (mg/L)	0.5	0.22	0.07	0.15	0.09

Table 3-18. Ina Road Water Pollution Control Facility Discharge Monitoring Report, 2000 (Pima County WWM, 2001)

*Constituent (Units)**	*Permit Limits*	*1st Quarter Averages Jan- Mar*	*2nd Quarter Averages Apr-June*	*3rd Quarter Averages July-Sept*	*4th Quarter Averages Oct-Dec*
Flow (MGD)	Up to 25	22.5	23.1	22.1	24.3
Suspended Solids (Kg/day)	2,839	1,516	1,398	1,151	2103
Suspended Solids (mg/L)	45	19	18	16	31
Fecal Coliform (#/100ml)	200	5	14	31	28
pH	6.5 - 9.0	7.1	7.1	7.2	7.2
Disinfectant Residual (mg/L)	0.5	0.30	0.44	0.15	0.35

Tables 3-19 and 3-20 list compounds that were detected in the quarterly monitoring during 2000.

Table 3-19. Quarterly Priority Pollutant Organic Compounds Detected in Effluent from Ina Road WPCF, 2000 (Pima County WWM, 2001)

Parameter	*Detected Samples*	*Mean – Max. µg/L*
Chloroform	4 of 4	1.6- 2.0
1,4-Dichlorobenzene	4 of 4	4.0-6.4
Methylene Chloride	4 of 4	<1.0-1.02
Tetrachloroethylene	1 of 4	<0.5
Toluene	2 of 4	<0.32-<0.5
Diethyl phthalate	1 of 4	<5
Bis(2-ethylhexyl)phthalate	4 of 4	14.7-34.8

Table 3-20. Quarterly Priority Pollutant Organic Compounds Detected in Effluent from Roger Road WWTF, 2000 (Pima County WWM, 2001)

Parameter	*Detected Samples*	*Mean-Max. µg/L*
Chloroform	4 of 4	<0.81-1.32
1,4-Dichlorobenzene	2 of 4	<1-<5
Methylene Chloride	4 of 4	<1.41-1.63
G-BHC(gamma)	1 of 4	0.38
Toluene	3 of 4	<0.41-<0.5
Bis(2-ethylhexyl)phthalate	2 of 4	<7.1-16.3
Pentachlorophenol	1 of 4	<10.0

Table 3-21 shows results from effluent sampling for metals at the Roger Road and Ina Road wastewater treatment facilities in 2000.

Table 3-21. Priority Pollutant- Metals, Quarterly Sampling for 2000 (Pima County WWM, 2001)

Parameter (mg/L)	*Ina Road WPCF 12 month mean*	*Ina Road WPCF 12 month max*	*Roger Road WWTP 12 month mean*	*Roger Road WWTP 12 month max*
Antimony	<0.0021	<0.0037	<0.0021	<0.0037
Arsenic	<0.0039	<0.0080	<0.0081	<0.0100
Beryllium	<0.0009	<0.0013	<0.0007	<0.0013
Cadmium	<0.0006	<0.0008	<0.0018	<0.0050
Chromium	<0.0054	0.0134	<0.0065	0.0188
Copper	0.0256	0.0270	0.018	0.025
Cyanide	<0.008	<0.015	<0.005	<0.005
Lead	<0.0019	<0.0050	<0.0019	<0.0050
Mercury	<0.000026	<0.000026	<0.000026	<0.000026
Molybdenum	<0.0066	<0.0079	0.0207	0.0251
Nickel	<0.0029	<0.0050	0.0050	0.0058
Selenium	<0.0022	<0.0038	<0.0022	<0.0038
Silver	<0.0015	<0.0019	<0.0036	<0.0050
Thallium	<0.0017	<0.0047	<0.0017	<0.0047
Zinc	0.0377	0.0434	0.0346	0.0394

Under a state wastewater reuse permit the reclaimed water produced at the Ina and Roger Road wastewater treatment plants is monitored for flow, turbidity, fecal coliform, pH, enteric virus and *Ascaris lumbricoides* (Dotson, 2001). Water is sampled at a point that is representative of the quality of water received by the reclaimed water customers. The reclaimed water has a higher TDS concentration than secondary effluent. This is due in part to mixing with groundwater at the Sweetwater Underground Storage and Recovery facility, where background TDS levels are higher than most Tucson Water wellfields (PAG, 1994). Tables 3-22 and 3-23 present data provided by Tucson Water for this sample point. All of the data are within permitted limits.

Table 3-22. Tucson Water Reclaim System Water Quality, January – July 2001 (PAG, 2002a)

Constituent	*Average*	*No. of Samples*
Total Dissolved Solids	657 mg/L	6
Total Kjeldahl Nitrogen	10.09 mg/L	6
Total Organic Carbon	7.75 mg/L	6
Total Suspended Solids	1.6 mg/L*	7
Turbidity	3.28 NTU	6
Ammonia as N	6.29 mg/L	6
Nitrate as N	3.87 mg/L	7
Chloride	107.43 mg/L	7
pH	7.7 su	6
Conductivity	1012.66 umhos/cm	6
Fluoride	0.9	7
Potassium	8.2 mg/L	2
Phosphate as P	1.52 mg/L	6
Sulfate	120.8	7
Calcium	59.5	2
Total Alkalinity	247	3
Sodium	130 mg/L	2

*- This value calculated using a value of zero for one sample with a result of <1.

Samples collected on January 4, 2001, and April 12, 2001, also were analyzed for VOCs and metals. In general these constituents were only detected at levels less than the lowest standard or quantification limit of the method. Aluminum, arsenic, barium, boron, copper, iron, magnesium, nickel and zinc were all present at detectable levels, but below permit limits. The results of the two samples are listed on Table 3-23.

Table 3-23. Analytical Results for Reclaimed Water Quality (PAG, 2002a)

Constituent (mg/L)	*1/4/01*	*4/12/01*
Aluminum, Total	<.1	0.12
Arsenic, Total	0.0038	0.0055
Barium, Total	0.033	0.031
Boron, Total	0.3	0.29
Copper, Total	0.015	<0.01
Iron, Total	0.11	0.084
Magnesium, Total	10	9.9
Nickel, Total	0.013	<0.01
Zinc, Total	0.026	0.039

3.6.4. Surface water quality

ADEQ conducts long-term, statewide water quality monitoring, while other agencies and organizations conduct water quality monitoring at smaller spatial and temporal scales. Surface water quality monitoring in Pima County is limited because there are very few perennial surface water bodies. Where surface water is impaired, it is often due to natural processes like fires or chemical weathering of bedrock, or human activities like urbanization or chemical use associated with mining or agriculture. Common constituents of concern in Pima County are suspended sediments/turbidity, dissolved oxygen, nutrients, metals and pathogens.

3.6.4.1. Surface water quality data

Required by the Clean Water Act Section 305(b), ADEQ compiles periodic reports detailing surface water quality in Arizona. Surface water bodies, including stream reaches and lakes, are sampled for different parameters and assessed as to whether or not they attain the water quality standards associated with the designated use of the water body. ADEQ-defined designated uses are as follows:

- Aquatic and Wildlife
  - Coldwater Fishery
  - Warmwater Fishery
  - Ephemeral Stream
  - Effluent Dependent Water
- Full Body Contact (i.e., swimming)
- Partial Body Contact (i.e., nonswimming recreation)
- Fish Consumption
- Domestic Water Source
- Agricultural Irrigation
- Agricultural Livestock Watering

Assessment categories include Attaining All Uses (Category 1), Attaining Some Uses (Category 2), Inconclusive (Category 3), Not Attaining (Category 4), and Impaired (Category 5). Category 1 waters meet the water quality standards for all designated uses. Category 2 waters attain the water quality standards for at least one designated use, while the other uses are deemed inconclusive. The inconclusive category indicates the sampling data do not show a clear result or no credible data is available. Category 4 waters are not attaining at least one designated use, and a Total Maximum Daily Load has been completed for the reach or the reach is expected to attain all designated uses by the next listing cycle. Impaired waters do not attain water quality standards for any designated use and require development of a TMDL plan in an effort to restore surface water quality.

ADEQ assessed seven stream reaches and four lakes in Pima County for the 2004 305(b) report. Of these, one stream reach was designated attaining all uses and one lake was assessed impaired relative to certain pollutants. The remaining assessed water bodies were inconclusive or attaining some uses (ADEQ, 2004). Appendix D lists all of the water quality results for monitored surface water bodies in Pima County.

<u>Attaining All Uses (Category 1)</u>
Cienega Creek (Gardner Canyon - USGS gage (Pantano Wash)

<u>Attaining Some Uses (Category 2)</u>
Kennedy Lake
Sabino Canyon Creek (tributary at 32E23'28"/110E47'00" - Tanque Verde Wash)
Santa Cruz River (Canada del Oro - HUC boundary 15050303) - Chlorine

<u>Inconclusive (Category 3)</u>
Chimenea Creek (headwaters – Rincon Creek)
Loma Verde Wash (headwaters – unnamed tributary to Tanque Verde Wash)
Madrona Creek (headwaters - Rincon Creek)
Santa Cruz River (Roger Road WWTP outfall - Rillito Creek)

Not Attaining (Category 4)
Arivaca Lake – Mercury, dissolved oxygen, pH, selenium

Impaired Waters (Category 5)
Lakeside Lake – Dissolved oxygen, ammonia, turbidity
Rose Canyon Lake* – pH
*EPA addendum is pending.

In addition to ADEQ's monitoring, several perennial or intermittent water bodies that are potentially very important aquatic habitat in Pima County have been sampled for studies conducted as part of the Sonoran Desert Conservation Plan. These include Cienega Creek, Bingham Cienega and the San Pedro River.

A portion of Cienega Creek has been designated by the state as a "Unique Water," which means it qualifies for site-specific water quality standards established to maintain and protect the existing water quality. Fonseca, et al. (1990) concluded that the water quality of base flows in the reach nominated for Unique Water status met designated uses standards, including aquatic and wildlife (warm-water). The lowermost reaches of Cienega Creek were sampled more recently (in the late 1990s) as part of a two-year study by PAG and Pima County Flood Control District to determine the source of the water. The results are summarized on Table 3-24.

Bingham Cienega is a perennial wetland located approximately 2,000 feet west of the lower San Pedro River, and ¼ mile north of the settlement of Redington. PAG and the Pima County Flood Control District sampled Bingham Cienega, the San Pedro River, and Edgar Canyon (a tributary to the San Pedro) in the late 1990s, in order to identify the water source of the cienega. The results are summarized on Table 3-24.

Table 3-24. Average Values, Water Quality Data for Selected Streams in Pima County, September 1998-June 2000 (PAG, 2000; PAG 2001a)

Analyte (mg/L)	*Cienega Creek*	*Bingham Cienega*	*San Pedro River*	*Edgar Canyon*
Ca dissolved	109	64	64	64
Mg dissolved	32	12	16	15
Na dissolved	61	40	55	24
K dissolved	5.9	1.7	2	1.1
Alkalinity $CaCO_3$	252	219	222	238
SO_4 dissolved	257	55.8	90.2	18.6
Cl dissolved	14	11	18	6.9
F dissolved	0.57	1.14	0.92	0.39
Arsenic dissolved	0.0006	0.0043	0.0022	0
TDS	737	280	344	287

0 = constituent was not detected at the Practical Quantitation Limit (PQL).

3.6.4.2. Water quality limited waters and TMDLs

For waters that are designated Impaired, ADEQ is required to calculate a TMDL of a water quality parameter that will not cause an exceedance of surface water quality standards. They are also required to implement the TMDL by tracking pollutant sources, and managing them in such a way that water quality standards are met. Table 3-25 lists all TMDL projects in Pima County (ADEQ, 2004; ADEQ 2004a).

Table 3-25. Historical and Current Impaired Waters in Pima County (ADEQ, 2004; ADEQ, 2004a)

Impaired Water	*Pollutant(s)*	*Year First Listed*	*Status*
Arivaca Lake	Mercury	TMDL approved by EPA in 1999.	TMDL complete.
Lakeside Lake	Dissolved oxygen, pH, ammonia	2004	City of Tucson installed new aeration system on 06/25/02. City and ADEQ will monitor lake water quality for first year as part of implementation plan. The draft TMDL is available for review as of May 2004. High Priority. An AZPDES permit revision is pending for a discharge to this lake. Low dissolved oxygen and elevated ammonia are related to historic fish kills at this lake, and the lake is an important urban recreational area. Low dissolved oxygen and elevated ammonia may be related to seasonal activities. Reclaimed water and storm water inputs make this TMDL complex. Ongoing monitoring and investigation.

3.6.5. Stormwater runoff water quality

Stormwater runoff water quality data collection is often limited to urbanized areas in Pima County, especially the Tucson metropolitan area. Several agencies, including ADEQ, USGS, the City of Tucson and Pima County monitor stormwater quality data in metro Tucson. Table 3-26 indicates the City of Tucson's stormwater quality data for the 2003-2004 fiscal year. Stormwater was monitored at five locations representing different land uses typical to Tucson. They include: single family residential (Sfr), multi-family residential (Mfr), commercial (Com), industrial (Ind), and mixed-use (Mxu). The 2003-04 sampling results, similar to the results submitted in the previous annual report, indicated that Tucson stormwater was essentially free of sampled contaminants.

Table 3-26. FY 2003-2004 Monitoring Results for City of Tucson Stormwater (City of Tucson, 2004)

DATE	*7/12/2003*	*11/12/2003*	*7/25/2003*	*1/22/2004*	*7/18/2003*	*11/12/2003*	*7/12/2003*	*11/12/2003*	*7/17/2003*	*12/12/2003*
FACILITY	SFR	SFR	MFR	MFR	COM	COM	IND	IND	MXU	MXU
SITE	1	1	2	2	3	3	4	4	5	5
RAINFALL (in)	0.35	0.33	0.31	0.19	0.18	0.37	0.18	0.32	0.26	0.10
DURATION (minutes)	28	1260	18	604	46	1274	22	1260	230	102
LAST RAIN (days)	127	34	8	71	6	34	43	35	5	30
TOTAL FLOW (gal)	15,125	161,191	496,947	101,779	17,939	89,931	102,865	217,444	93,261	26,210
TEMPERATURE (C)	31.3	NA	25.3	11.8	23.4	17	30.6	17.3	25.8	7.1
pH	6.00	NA	6.00	7.10	6.00	6.73	6.09	6.77	6.00	7.48
Oil/Grease (mg/L)	<6.0	<5.1	6.0	<5.0	<5.0	<5.0	<5.1	<5.0	<5.1	<5.0
Arsenic, As (mg/L))	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010

DATE	*7/12/2003*	*11/12/2003*	*7/25/2003*	*1/22/2004*	*7/18/2003*	*11/12/2003*	*7/12/2003*	*11/12/2003*	*7/17/2003*	*12/12/2003*
Copper, Cu (mg/L)	0.052	0.018	0.014	0.017	0.018	0.010	0.12	0.041	0.057	0.021
Lead, Pb (mg/L)	0.018	<0.010	<0.010	<0.010	0.012	<0.010	0.048	<0.010	0.018	<0.010
Zinc, Zn (mg/L)	0.20	0.085	0.078	0.17	0.13	<0.050	0.67	0.16	0.43	0.32
Nitrogen, Total Kjeldahl, TKN (mg/L)	9.3	2.2	3.8	2.0	2.2	1.4	7.9	2.0	4.5	3.9
Nitrogen, Nitrate + Nitrite (as N) (mg/L)	2.1	0.72	1.9	1.2	1.0	<0.50	3.4	0.73	1.8	1.5
Phosphorus, P (mg/L)	0.58	0.41	0.39	0.32	0.25	0.18	0.61	0.39	0.49	0.30
COD (mg/L)	280	110	110	54	110	74	560	120	290	170
TSS (mg/L)	120	invalid	30	52	100	invalid	360	invalid	110	26
TSS* (mg/L) Resampled 1/22/04		93*				28*		340*		
BOD (mg/L)	120	13	27	13	16	9.2	130	23	46	49
Solids, Total Dissolved (mg/L)	320	74	90	94	92	64	380	100	170	200
Phenol (µg/l)	<13	<60	<10	<10	<10	<10	<56	<54	<50	<50
4,4-DDE (µg/l)	<3.3	<1.7	<0.30	<3.0	<1.6	<0.65	<3.1	<1.6	<1.5	<0.63
Hardness**									<10	

Total flow measured was for sampling period only.
Detection limit for DDE varies based on the dilution used during laboratory analysis.
All Samples were analyzed at Transwest Geochem.
*New TSS samples taken on January 22, 2004. Original TSS values were invalid because samples were analyzed after the holding time.
**Lab mistakenly analyzed one sample only for Hardness.
Undetected phenols: 4-Chloro-3-methylphenol (µg/l), 4,6-Dinitro-2-methylphenol (µg/l), 2-Chlorophenol (µg/l), 2,4-Dichlorophenol (µg/l), 2,4-Dimethylphenol (µg/l), 2,4-Dinitrophenol (µg/l), 2-Nitrophenol (µg/l), 4-Nitrophenol (µg/l), Pentachlorophenol (µg/l), and 2,4,6-Trichlorophenol (µg/l).

Table 3-27 is a similar table, indicating stormwater quality sampling results conducted by Pima County in 1999-2000. Five sites were monitored, each representing a different land use, as indicated below.

Site 1: Residential, low density
Site 2A: Residential, medium density
Site 3: Residential, high density
Site 4: Commercial
Site 5: Industrial

Table 3-27. FY 1999-2000 Monitoring Results for Pima County Stormwater
(Pima County, 2000)

Facility	*Site 1*	*Site 1*	*Site 1*	*Site2A*	*Site 3*	*Site 3*	*Site 3*	*Site 4*	*Site 4*	*Site 4*	*Site 5*	*Site 5*
Date	*7/14/99*	*3/6/00*	*6/22/00*	*7/6/99*	*7/14/99*	*3/6/00*	*6/22/00*	*7/14/99*	*3/6/00*	*6/22/00*	*7/5/99*	*6/19/00*
H2O Temperature on arrival °C	29.3	9.6	23.0	24.0	31.3	10.5	24.5	30.0	10.4	26.4	27.2	22.2
H2O Temperature + 1 hour °C	-	9.0	-	23.9	-	10.1	27.1	-	11.1	25.7	27.8	25.1
H2O Temperature +2 hours °C	-	-	-	-	-	9.7	-	-	11.5	25.8	27.9	29.8
H2O Temperature + 3 hours °C	30.7	9.2	23.3	24.6	29.6	9.7	25.6	28.4	11.6	25.6	-	30.7
pH at arrival s.u.	9.07	6.97	8.03	7.94	6.58	7.43	7.79	7.32	7.39	7.76	8.03	8.65
pH + 1 hour s.u.	-	7.45	-	7.91	-	7.55	7.05	-	7.44	7.67	7.84	8.06
pH+ 2 hours s.u.	-	-	-	-	-	7.51	-	-	7.54	7.81	7.94	7.90
pH + 3 hours s.u.	8.16	7.5	7.42	7.25	7.72	7.45	7.15	8.24	7.46	7.95	-	7.90
Fecal coliform on arrival Mpn/100ml	3000	500	3000	160000	3000	11000	900	9000	17000	50000	5000	900
Fecal coliform +1 hour Mpn/100ml	-	-	-	-	-	-	-	-	-	-	-	-
Fecal coliform + 2 hours Mpn/100ml	-	-	-	-	-	-	-	-	-	-	-	-
Fecal coliform + 3 hours MPn/100ml	220	1300	2400	30000	1700	30000	1600	2400	1700	900	300	16000
Cu (µg/l)(total)	183	13.6	21.6	21.5	27.9	18.4	31.9	34.0	29.8	50.0	81.2	107
Pb (µg/l)(total)	210	ND	17.4	T	ND	ND	T	T	T	T	93.3	136
Zn (µ/l)(total)	476	36.2	48.9	78.6	161	129	183	46.5	165	155	214	305
Hardness (calculated) mg/L	876	46.1	57.5	41.1	32.2	27.7	54.3	88	36.0	58.0	285	272
TSS mg/L	5631	49	273	125	55	29	32	120	65	52	712	596
4,4-DDE (µg/l)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Mpn/100mg/L- most probable number per 100mg/L
--- no measurement taken or no sample collected
T-trace

Additional stormwater runoff quality data is indicated on Tables 3-28, 3-29 and 3-30 for the Santa Cruz River, Tanque Verde Creek and Rillito Creek, respectively. These samples were collected in the referenced surface water drainage, where the water flow consisted solely of stormwater. Prior to the precipitation event, they were dry.

Table 3-28. 1989 Stormwater Quality Data for the Santa Cruz River at Congress Street Bridge (PAG, 1991)

Parameter	*Concentration (mg/L)*
Calcium	17.6
Magnesium	2.32
Sodium	9.1
Potassium	9.3
Bicarbonate	75
Chloride	1.1
Sulfate	10
NO2+NO3	0.61
TDS (total dissolved solids)	90
TSS (total suspended solids)	10,600

Table 3-29. 1986-1992 Stormwater Quality Data for Tanque Verde Creek at Sabino Canyon Road (USGS, 1994; USGS, 1995)

Constituent	*Average (mg/L)*	*Minimum (mg/L)*	*Maximum (mg/L)*
Calcium	10.4	4.3	25
Magnesium	1.6	0.98	4.6
Sodium	6.0	4.1	10
Potassium	2.2	0.7	6.5
Aluminum (total)	117	0.47	410
Bicarbonate	34	14	68
Chloride	4.0	2.1	7.2
Sulfate	9.9	4.5	16
Nitrate	0.3	0.07	0.81
TDS	93	41	205
TOC	84	8.8	240
TSS	2891	22	10300

Table 3-30. 1986-1993 Stormwater Quality Data for Rillito Creek at Dodge Boulevard (USGS, 1994;USGS 1995)

Constituent	*Average (mg/L)*	*Minimum (mg/L)*	*Maximum (mg/L)*
Calcium	15	8.2	46
Magnesium	1.9	0.8	5.9
Sodium	6.6	1.9	15
Potassium	2.5	0.8	5.1
Aluminum (total)	195	44	550
Bicarbonate	53	28	121
Chloride	3.8	1.5	12
Sulfate	13	4.6	52
Nitrate	0.5	0.18	1.3
TDS	100	19	243
TOC	117	19	210
TSS	12089	21	36700

4. AGENCY AND AREA DESIGNATIONS

4.1 DESIGNATED PLANNING AGENCY AND PLANNING AREA

On July 8, 1970, Arizona Governor Jack Williams signed Executive Order 70-2, which divided Arizona into six planning districts and directed that all planning functions conducted on a district, regional or area-wide basis, conform to the prescribed planning areas. Executive Order 70-2 is included in Appendix E.

On March 25, 1974, Governor Williams designated PAG as the Section 208 area-wide waste treatment management planning agency for Pima County, which was one of the six planning districts established by Executive Order 70-2. Executive Order 70-2 and the Governor's designation letter are both included in Appendix E. Although PAG's Designated Planning Area legally encompasses all of Pima County, the Tohono O'odham Nation opted to produce their own 208 Plan for their lands. Therefore, PAG's 208 Plan only addresses non-Tohono O'odham lands. PAG's 208 Planning Area boundaries are shown on Figure 4-1.

PAG remains the sole Designated Planning Agency for Pima County.

4.2. DESIGNATED MANAGEMENT AGENCIES AND MANAGEMENT AREAS

The original 1978 PAG 208 Plan unconditionally designated Pima County as the management agency for wastewater treatment systems outside the metropolitan Tucson area. The 208 Plan also unconditionally designated the City of Tucson and Pima County as management agencies for their respective portions of the metropolitan municipal wastewater treatment system. However, the 208 Plan also recommended partial or full consolidation of the metropolitan system.

In 1979, the ownership and all responsibilities for the construction, operation, and maintenance of the City of Tucson's sewerage systems were transferred to Pima County. In recognition of the pending consolidation of facilities, the PAG Regional Council passed resolution 78-12-07 in December 1978 requesting that the Governor designate Pima County as the single 208 Management Agency (DMA) for municipal wastewater treatment and sewer system operations (see Appendix B). This designation was noted in a 1980 amendment to the 1978 PAG 208 Plan.

Pima County remained the sole DMA in the PAG planning area until March 1999, when the PAG Regional Council approved a 208 Plan Amendment designating the Town of Sahuarita as a management agency. The area designated for the new Sahuarita DMA encompassed the incorporated Town of Sahuarita limits excluding areas already served by Pima County. This area is described in Appendix F and shown on Figure 4-2.

Since the Sahuarita 208 Plan Amendment was approved, the Town has annexed a number of areas. The Town's incorporated limits as of August 2005 are shown on Figure 4-3. In recognition of the Town's annexations, and in order to ensure that the citizens of the Town and Pima County receive the best and most affordable wastewater service, the Town's Designated Management Area is hereby expanded. PAG has delineated the Town's expanded DMA boundaries in consultation with Town staff and Pima County Wastewater Management

Department staff. The basis for delineating the boundaries is the agreed upon concept that areas should be served by the wastewater treatment facility (i.e., the Sahuarita facility or a Pima County facility) to which it is most practical, technically feasible and economically feasible to route the flows. The DMA boundaries are shown on Figure 4-4.

Some areas near Sahuarita could be served in the future by either the Town's facility or a Pima County facility. These are hereby designated as "Joint Planning Areas" and are shown on Figure 4-4. These areas are not officially assigned to either DMA at this time. Instead, Pima County and the Town of Sahuarita will work together to decide who will serve these areas when the need for service arises. Service of the Joint Planning Areas by either DMA will be considered consistent with the 208 Plan, provided that the DMAs agree. Some areas east of the Town's current incorporated limits are included among the Joint Planning Areas. The Town might annex these areas in the future, and they could be served by either Pima County or the Town.

The remainder of Pima County, excluding tribal lands, is within Pima County Wastewater Management Department's Designated Management Area, which is shown on Figure 4-5. At the request of adjacent counties and with the concurrence of any impacted local jurisdictions, Pima County may consider providing service to customers outside the Pima County limits to benefit the general health, environment and economy of these areas. As an example, Pima County Wastewater Management Department, at the request of Pinal County, currently provides service to an area north of the Pima/Pinal County line along Route 77, because service by Pima County is the most practical alternative in this area.

4.3. NON-DMA SERVICE AREAS

Several sewage treatment facilities are operated by entities other than the Town of Sahuarita or Pima County. These facilities are within Pima County's Designated Management Area, but they were either constructed prior to implementation of the 208 Plan, or Pima County Wastewater Management Department declined to provide service to the areas. In one case (the Arizona State Prison), a facility was constructed despite the fact that it was directly in conflict with the approved 208 Plan.

Sewage treatment facilities currently operated or proposed to be operated by entities other than the two Designated Management Agencies are shown on Figure 4-5. They include:

- Adonis
- Ajo Improvement Company
- Arizona State Prison
- Lukeville
- Marana High School
- Milagro Subdivision
- MTC
- Organ Pipe Cactus National Monument
- Saguaro Ranch Guest Ranch
- Sahuarita High School Wetlands
- University of Arizona Science and Technology Park
- U. S. Forest Service – Palisades Ranger Station

All of these facilities are located within the Pima County Designated Management Area. No expansion to these facilities' service areas is permitted without an approved and certified 208 Plan Amendment.

4.3.1. Adonis

The Adonis Sanitary Sewerage Facility serves residents of the Adonis Mobile Home Park at Grier Road east of I-10 (Figure 4-6). The facility is operated by the Homeowners Association for the Adonis Mobile Home Park and has had compliance problems in the past. Plant closure and connection to the regional sewage collection and treatment system is recommended.

4.3.2. Ajo Improvement Company

A sewage treatment facility serving the community of Ajo was identified in the original 208 Plan. A 208 Plan Amendment approved in July 1999 addressed construction of a new 0.6 MGD facility to be operated by the Ajo Improvement Company on the site of the old facility. The facility is located in Section 14 of Township 12 South, Range 6 West, between Well Road and the Phelps Dodge tailing pond. Ajo Improvement Company has a Certificate of Convenience and Necessity from the Arizona Corporation Commission. The certificate area is shown on Figure 4-7.

4.3.3. Arizona State Prison

The wastewater treatment facility serving the Arizona State Prison on South Wilmot Road (Figure 4-8) was constructed despite the fact that it was not part of the 208 Plan and no 208 Plan Amendment was completed. The facility remains inconsistent with the 208 Plan. The prison should be served by Pima County, which is the DMA for the area.

4.3.4. Lukeville

The Lukeville border station (Figure 4-9) has a package treatment plant with a capacity of 10,000 gpd. Daily flow is approximately 2,500 gpd. The system serves 13 employee residences, a trailer space and two sets of public rest rooms (Wallin, 2005).

4.3.5. Marana High School

The Marana High School (Figure 4-10) was previously served by a septic system. The school is now served by a 0.07 MGD package plant, which serves only the school grounds and not any off-site properties. Regional service is expected to be available by the end of the plant's operational life, at which time the school will connect to the County sewer system.

The Marana Junior High School located southeast of Grier Road and Lon Adams Road also had its own sewage treatment facility at one time. This facility was identified in the original PAG 208 Plan and in the 2000 Marana 208 Update. However, the school connected to the County sewer system in 1999.

4.3.6. Milagro Subdivision

The Milagro Subdivision on Tucson's west side (Figure 4-11) is served by a common septic system with disposal via wetlands and subsurface drip irrigation. The community's homeowners association is responsible for operation and maintenance of the treatment system, which serves 28 homes, a guest house and common building.

4.3.7. MTC

Management Training Corporation (MTC) operates the Marana Community Correctional Facility, which is served by an on-site sewage treatment facility. The site is located in Section 5 of Township 12 South, Range 11 East, west of Sanders Road and north of Silverbell Road (Figure 4-12). The facility's first phase had a capacity of 0.065 MGD with a subsequent expansion to 0.13 MGD. The plant is not authorized to serve any areas other than the correctional facility. When regional service is available, the existing plant will be abandoned and connection will be made to the regional infrastructure.

4.3.8. Organ Pipe Cactus National Monument

A wastewater system at Organ Pipe Cactus National Monument (Figure 4-13) consists of a collection system and three lagoons. Effluent is disposed via evaporation. The system serves six restrooms and a dump station at the campground and two employee residences. Maximum occupancy is 400 in the winter (Wallin, 2005).

4.3.9. Saguaro Ranch Guest Ranch

A small (0.016 MGD) privately-owned on-site package plant has been proposed to serve 28 casitas, a restaurant, amphitheater and restrooms at a guest ranch centrally located in the Saguaro Ranch subdivision in the foothills of the Tortolita Mountains (Figure 4-14). The facility will only serve the guest ranch; it will not serve any surrounding areas. Effluent disposal will be through on-site reuse and on-site subsurface leaching.

Although this area remains within Pima County's Designated Management Area, it is neither technically nor economically practical for Pima County Wastewater to serve this site.

4.3.10. Sahuarita High School Wetlands

The Sahuarita School District's combined campus at 350 W. Sahuarita Road (Figure 4-15) is served by an on-site septic system that discharges to a wetlands treatment system. The wetlands provide additional treatment to the wastewater generated on site, and they provide an environmental education opportunity for students. The wetlands only serve the campus; they may not serve any off-site areas.

4.3.11. University of Arizona Science and Technology Park

This facility is an extended aeration system with a capacity of 0.15 MGD serving the University of Arizona Science and Technology Park (Figure 4-16). The effluent is reused on site.

4.3.12. U. S. Forest Service – Palisades Ranger Station

This facility serves a ranger station in the Santa Catalina Mountains (Figure 4-17). It consists of a lined 500,000 gallon anaerobic treatment lagoon. Disposal is achieved through evaporation and seasonal reuse for irrigation when necessary to limit water level rises in the lagoon.

Figure 4-1. PAG 208 Planning Area Boundary

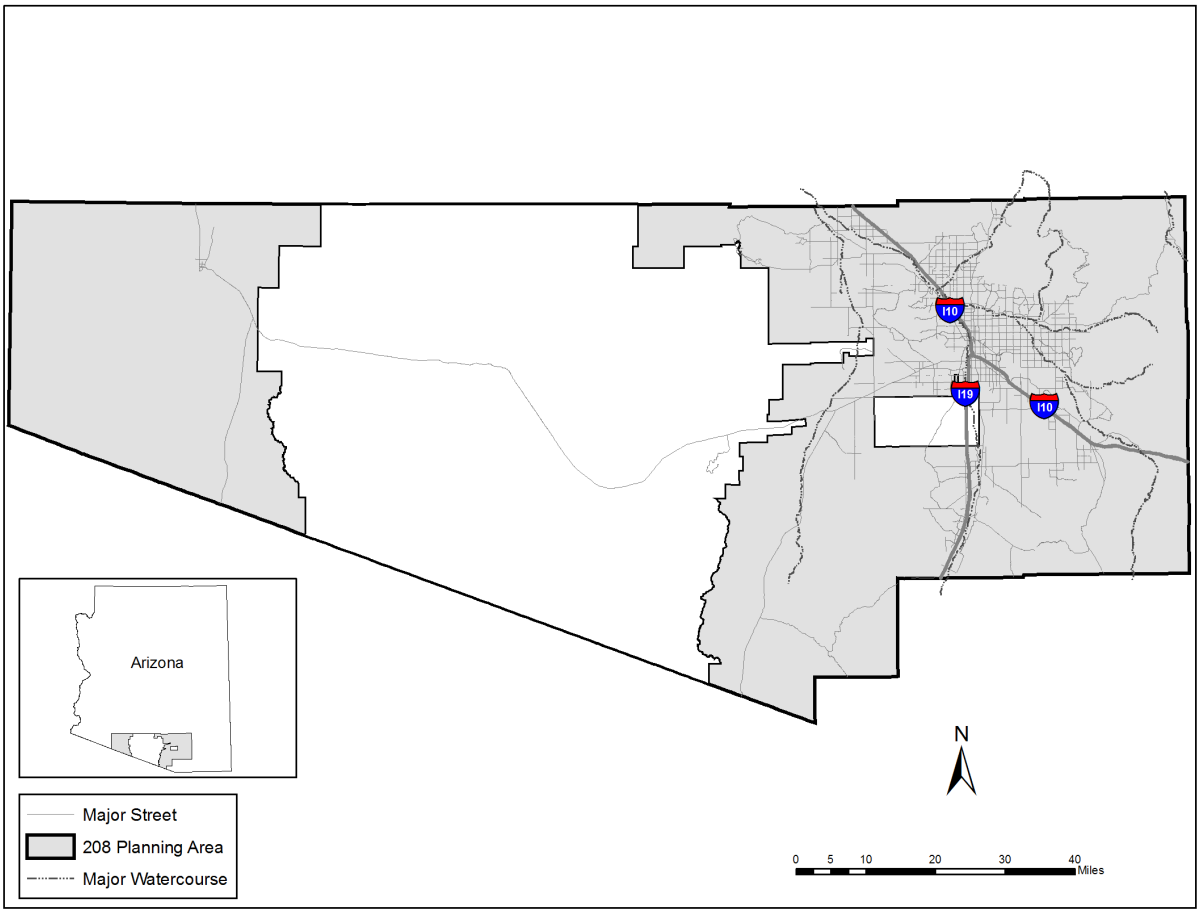


Figure 4-2. 1999 Sahuarita Designated Management Area

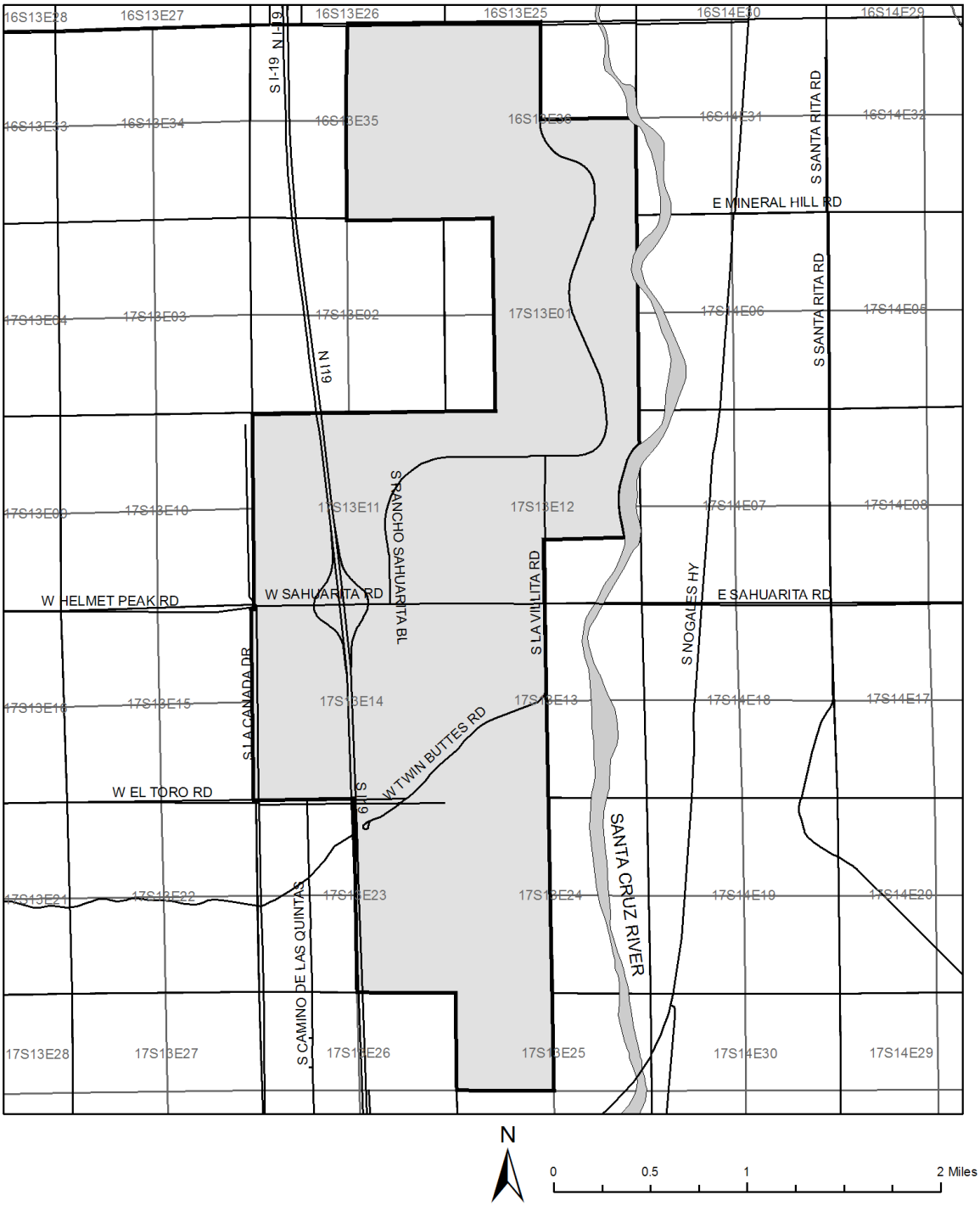


Figure 4-3. Town of Sahuarita Town Limits in 2005

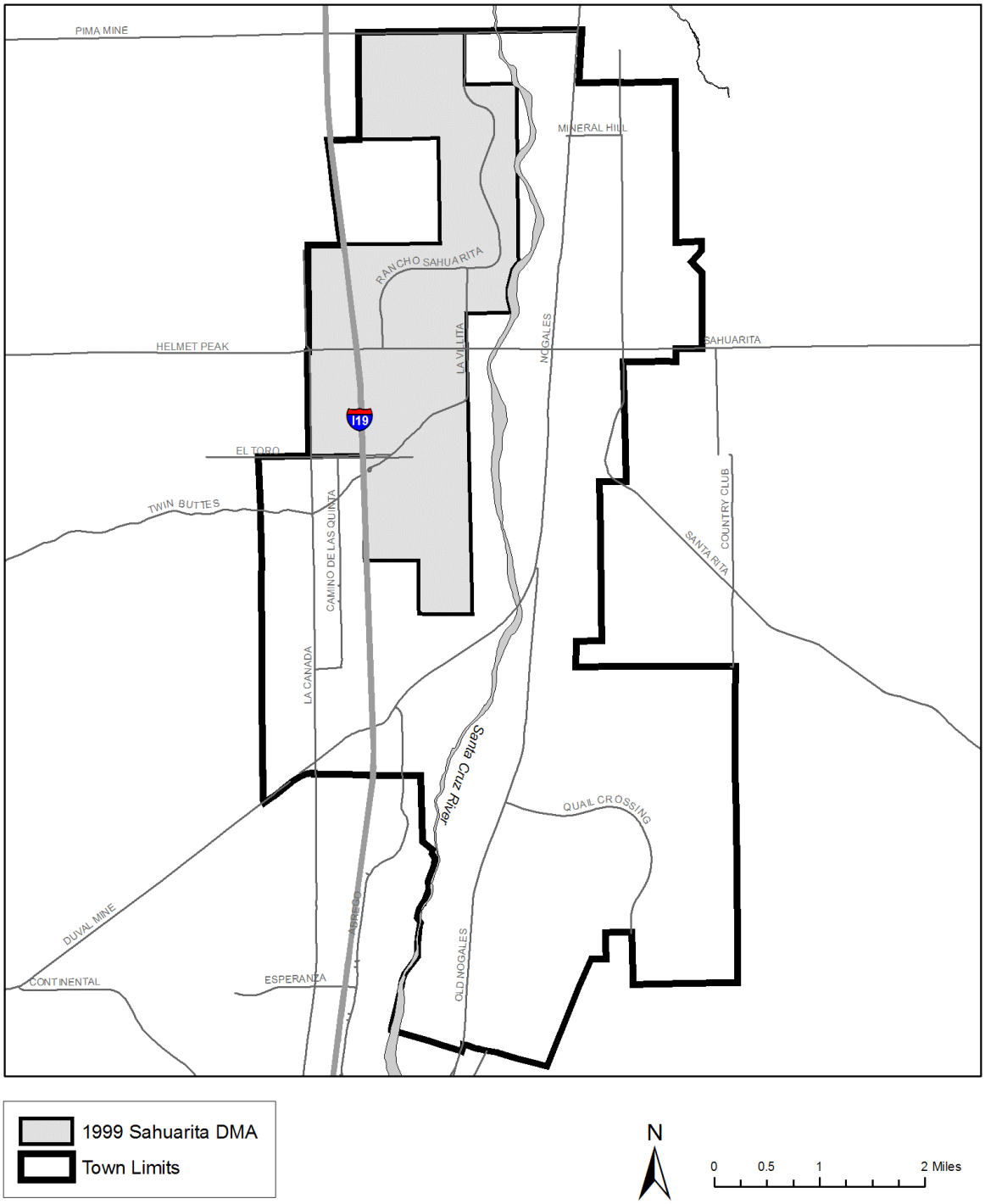


Figure 4-4. Pima County and Town of Sahuarita Designated Management Areas and Joint Planning Areas

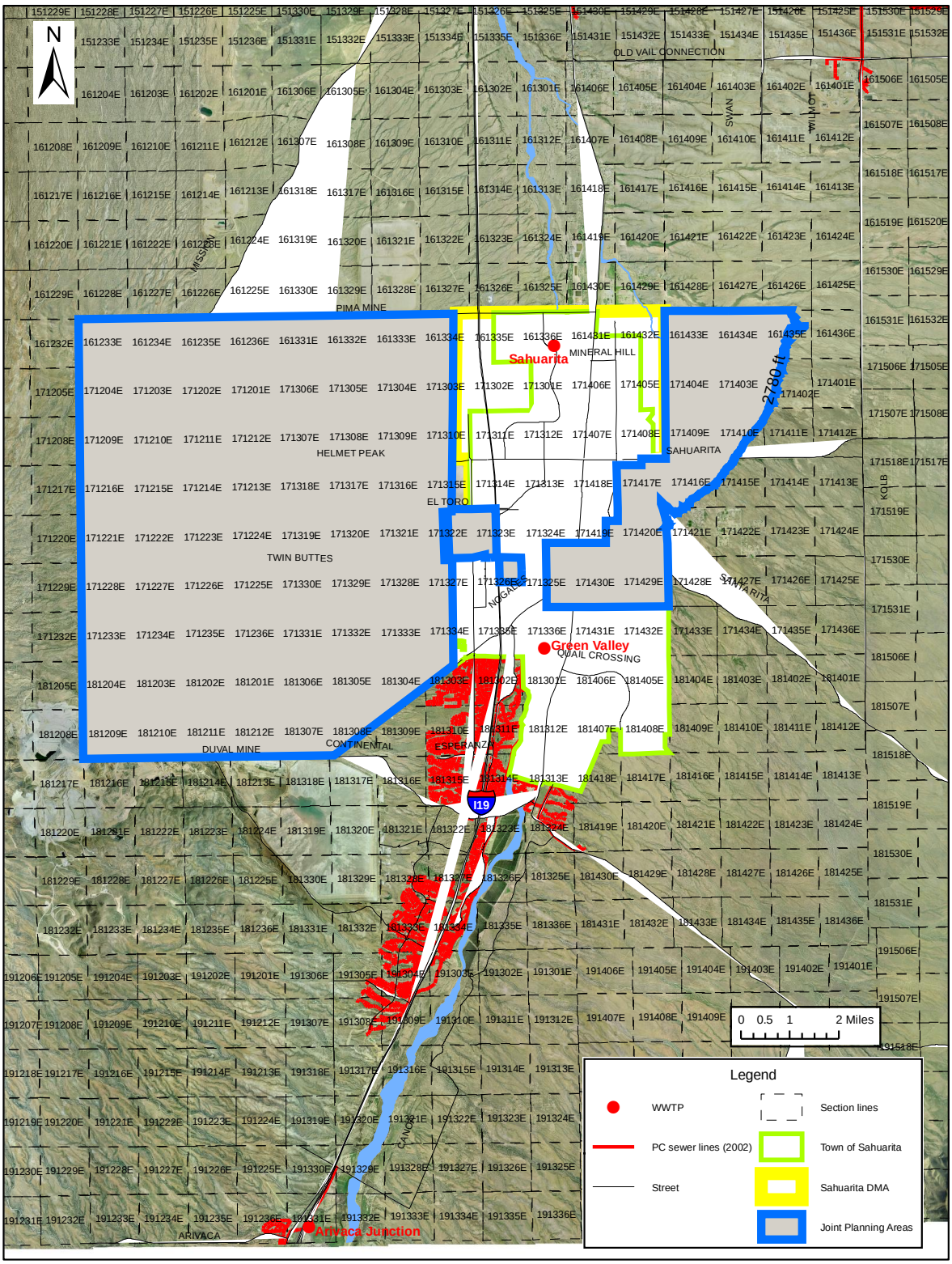


Figure 4-5. Pima County Designated Management Area (County-Wide) and Non-DMA Service Areas

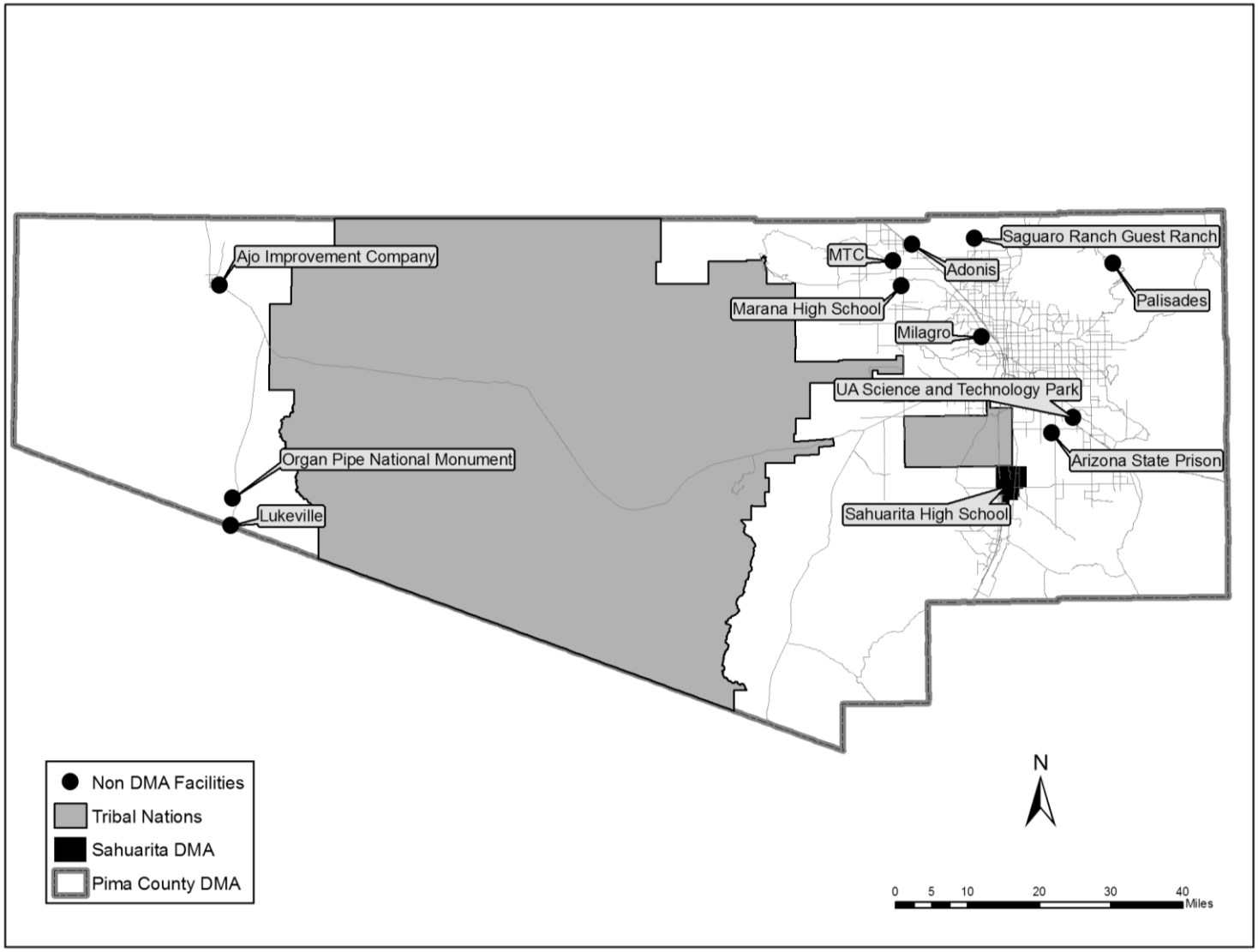


Figure 4-6. Adonis Service Area

Figure 4-7. Ajo Improvement Company Service Area

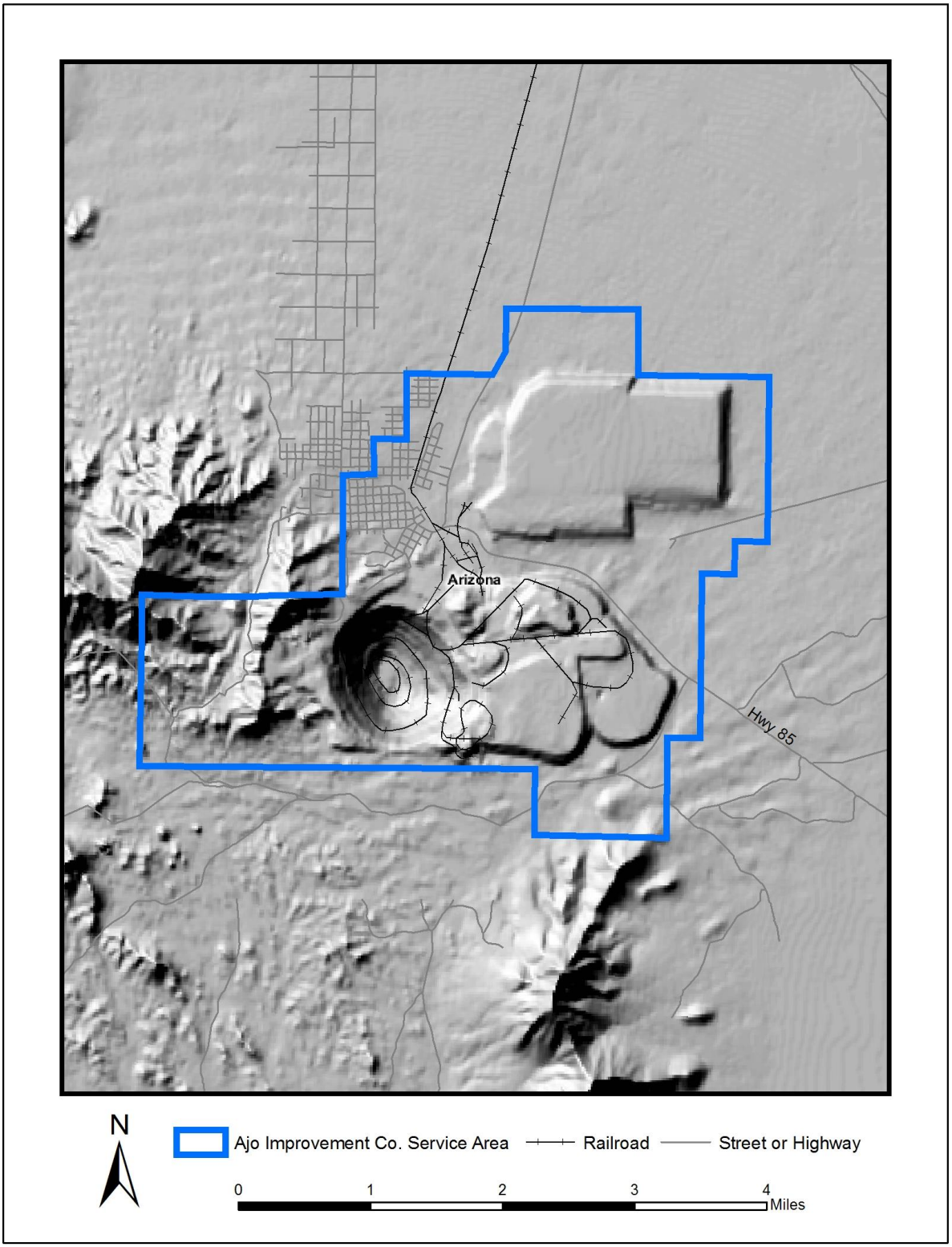


Figure 4-8. Arizona State Prison Service Area

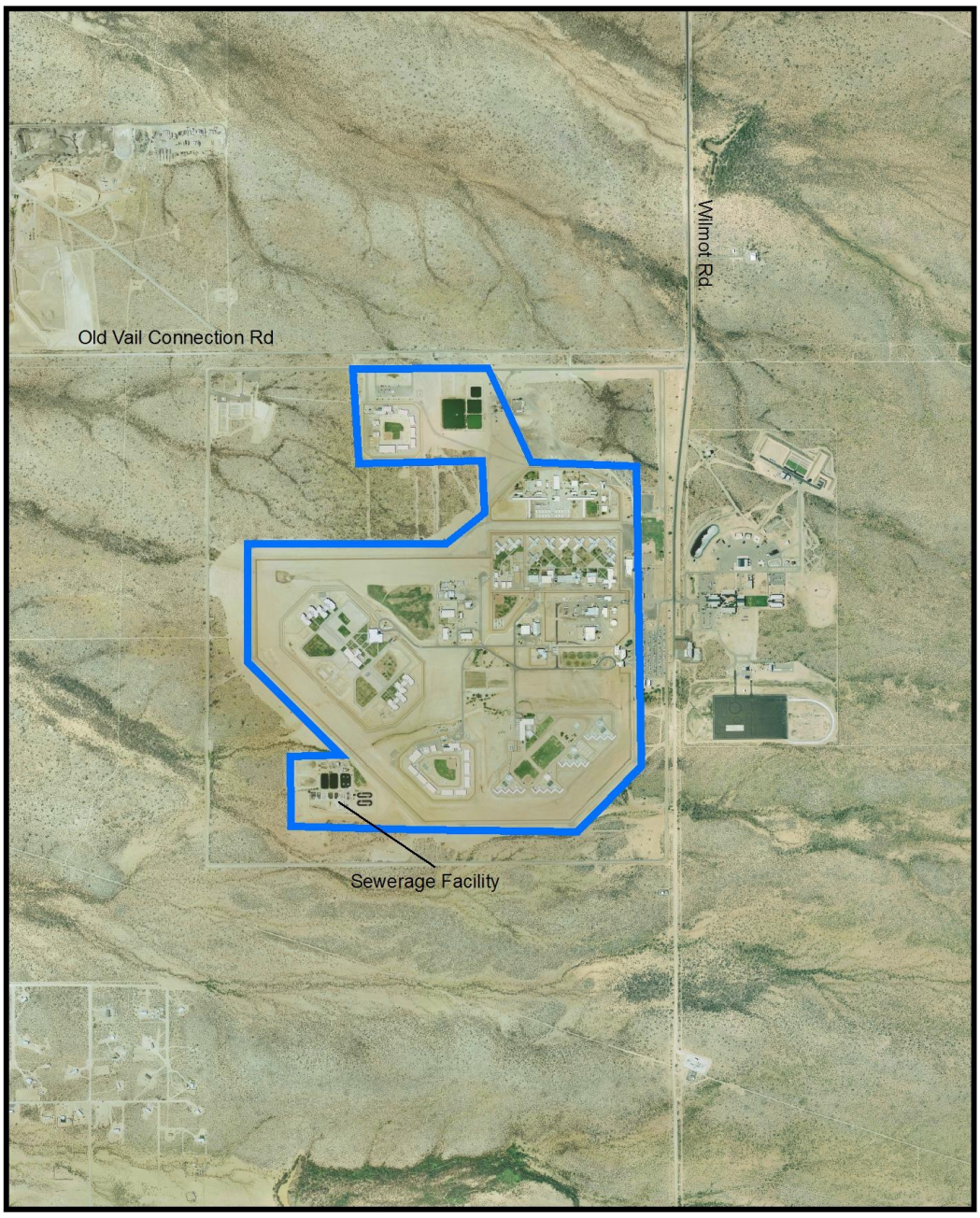


Figure 4-9. Lukeville Border Station WWTF Service Area

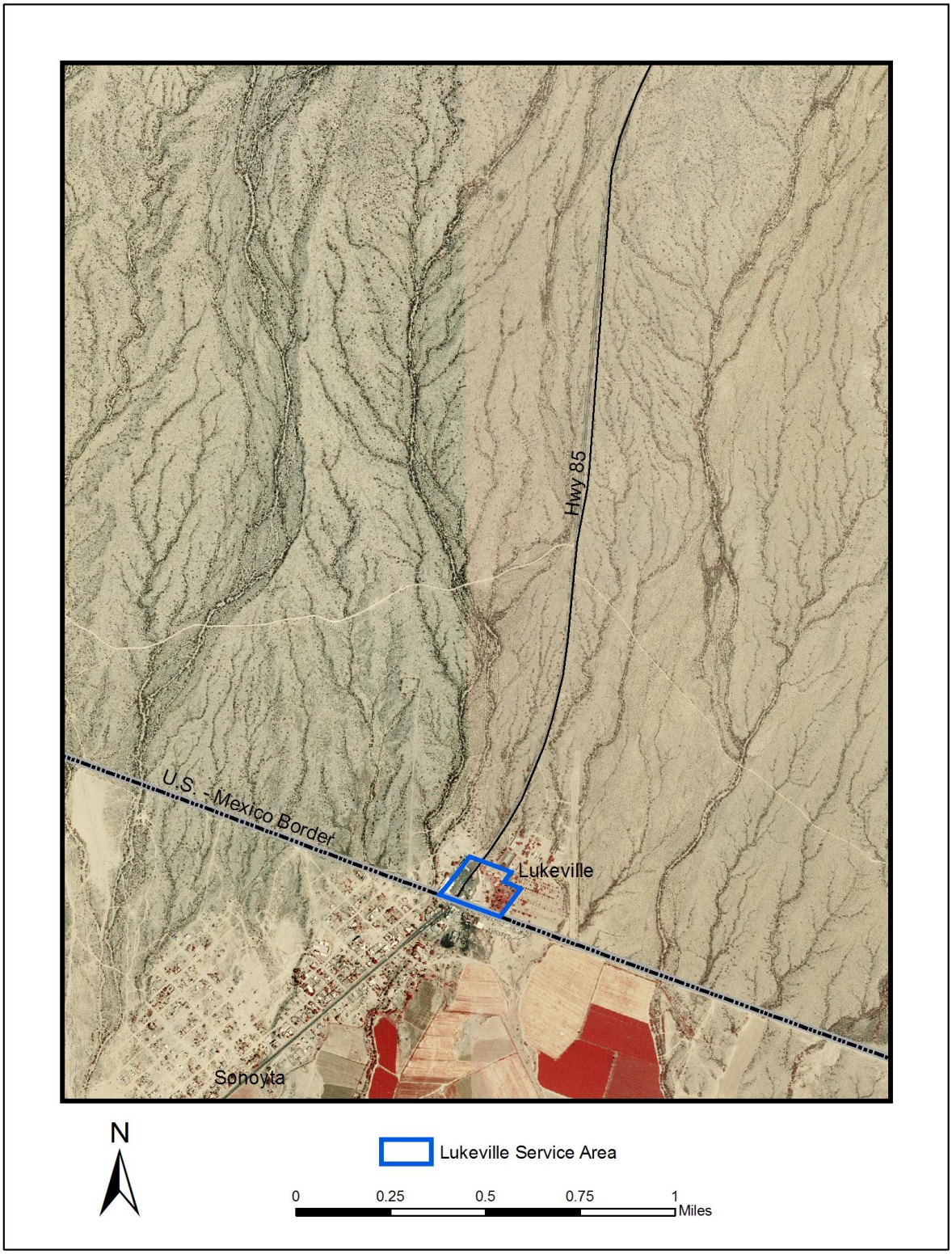


Figure 4-10. Marana High School WWTF Service Area

Figure 4-11. Milagro Subdivision WWTF Service Area

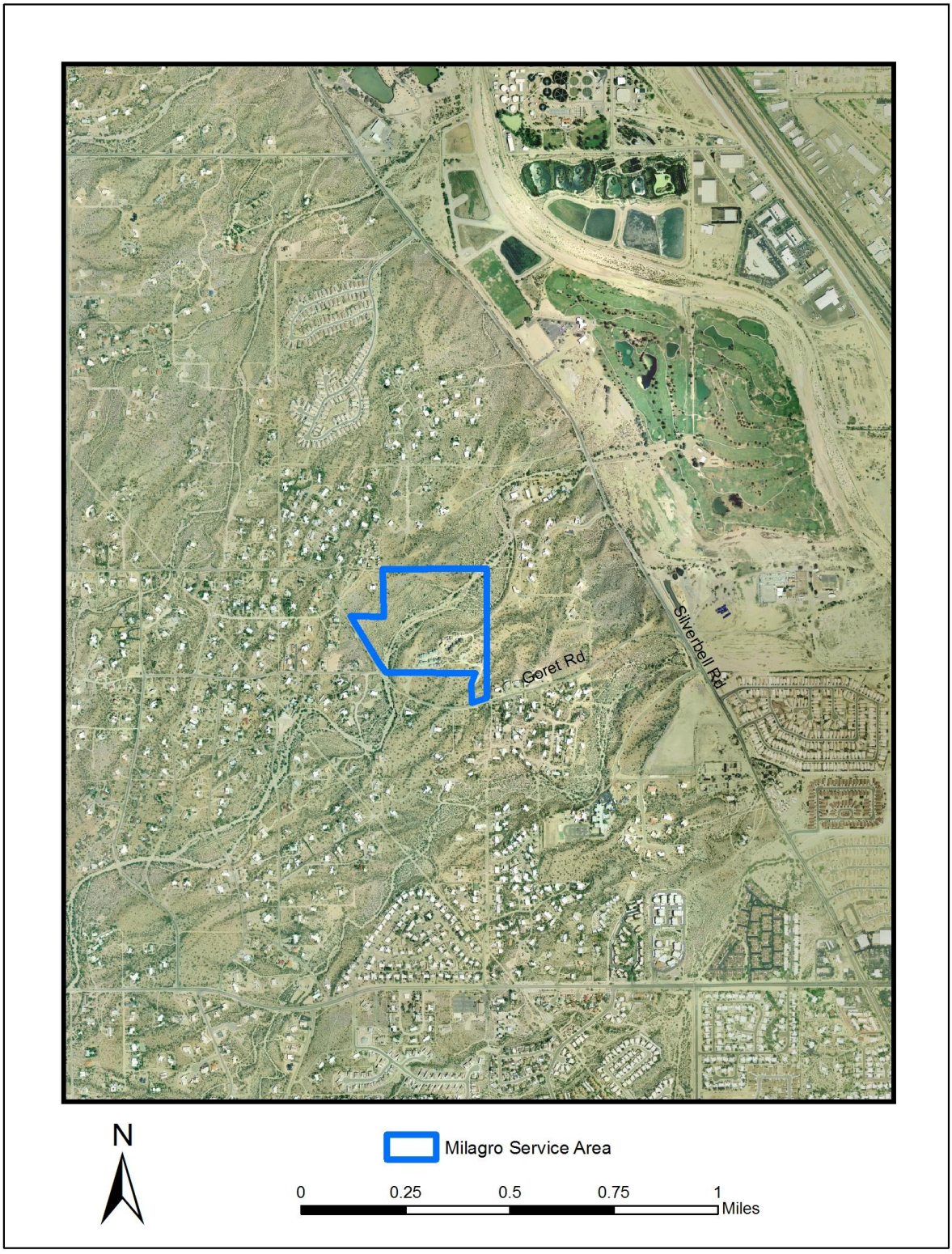


Figure 4-12. MTC Service Area

Figure 4-13. Organ Pipe Cactus National Monument Service Area

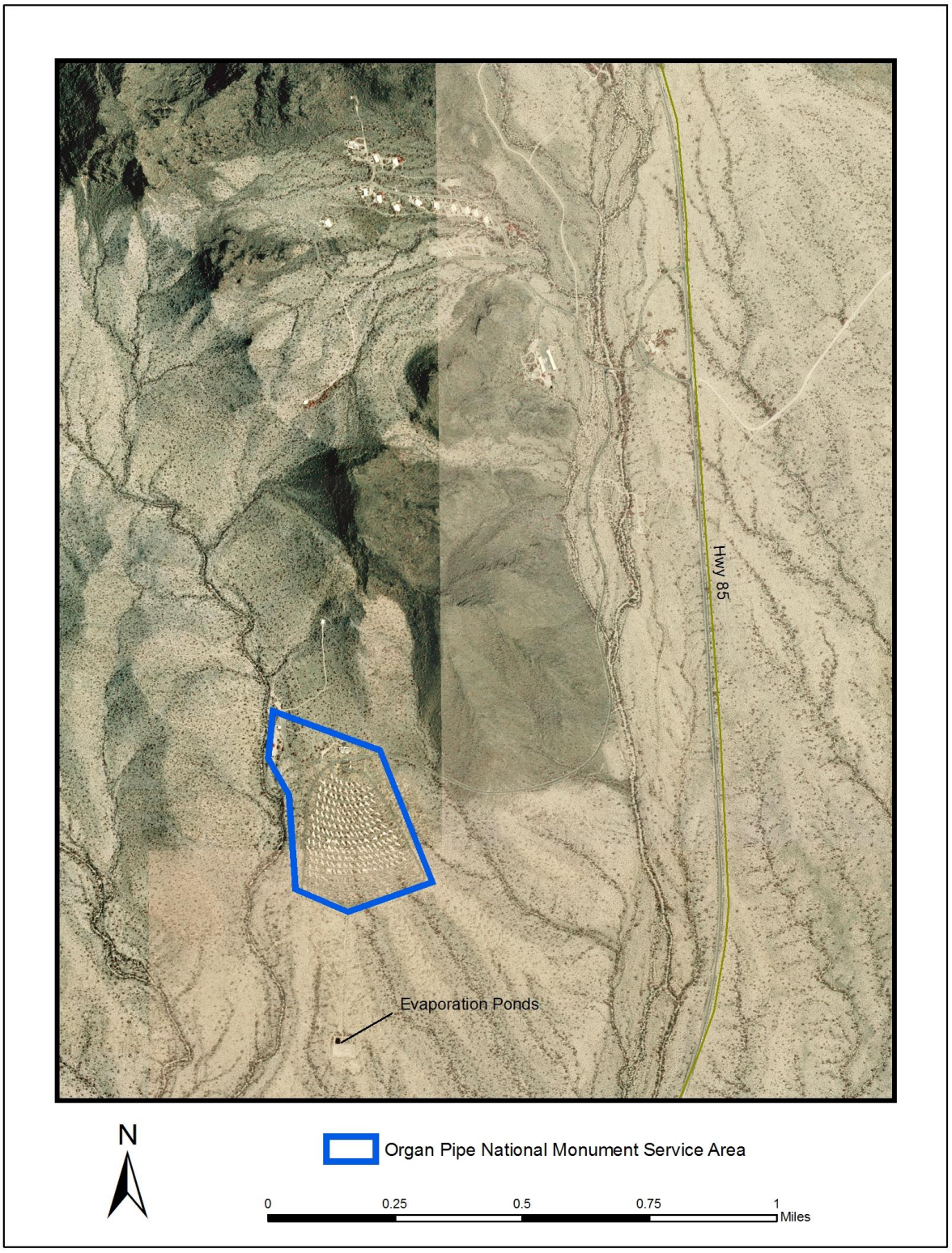


Figure 4-14. Saguaro Ranch Guest Ranch WWTF Service Area

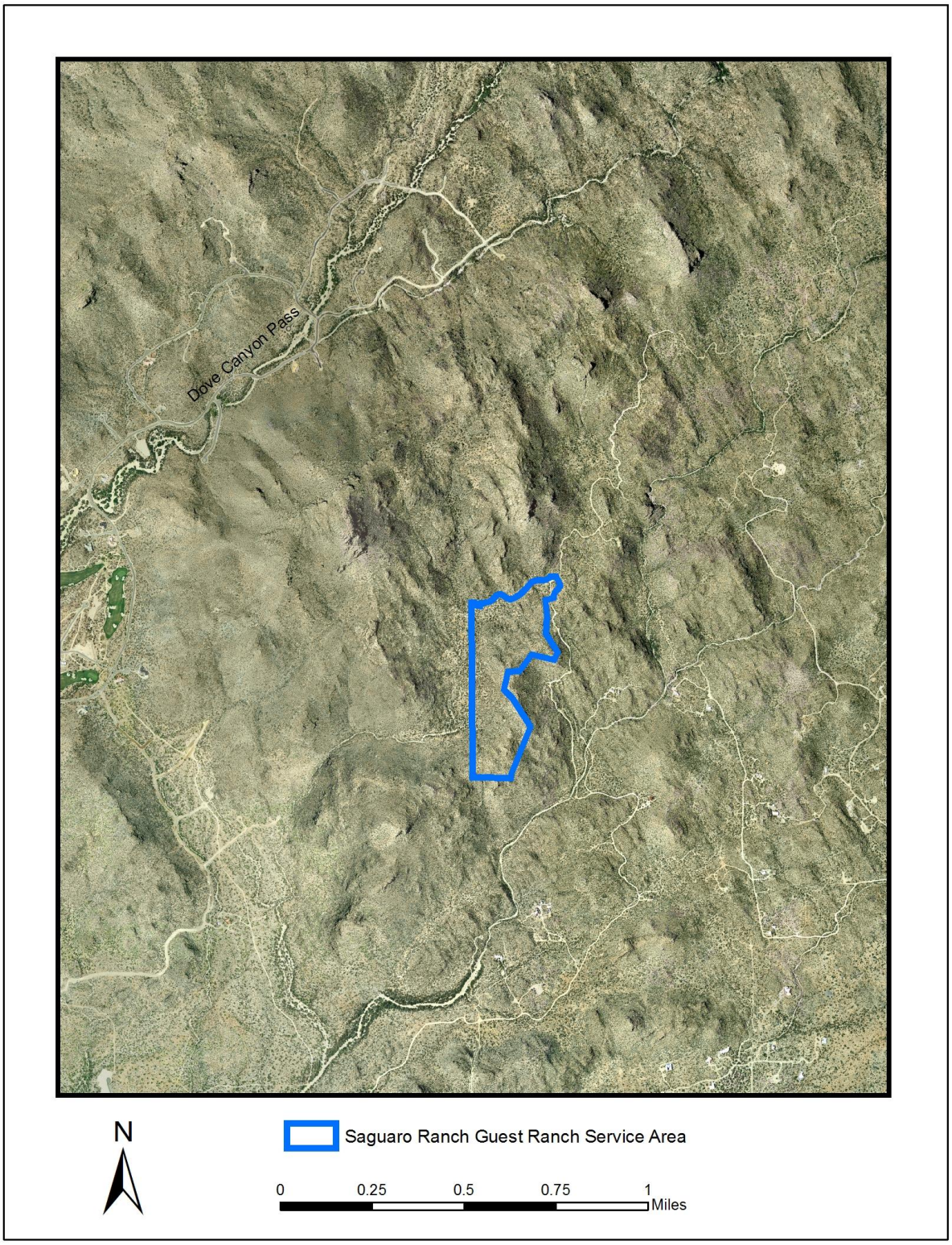


Figure 4-15. Sahuarita High School Wetlands Service Area

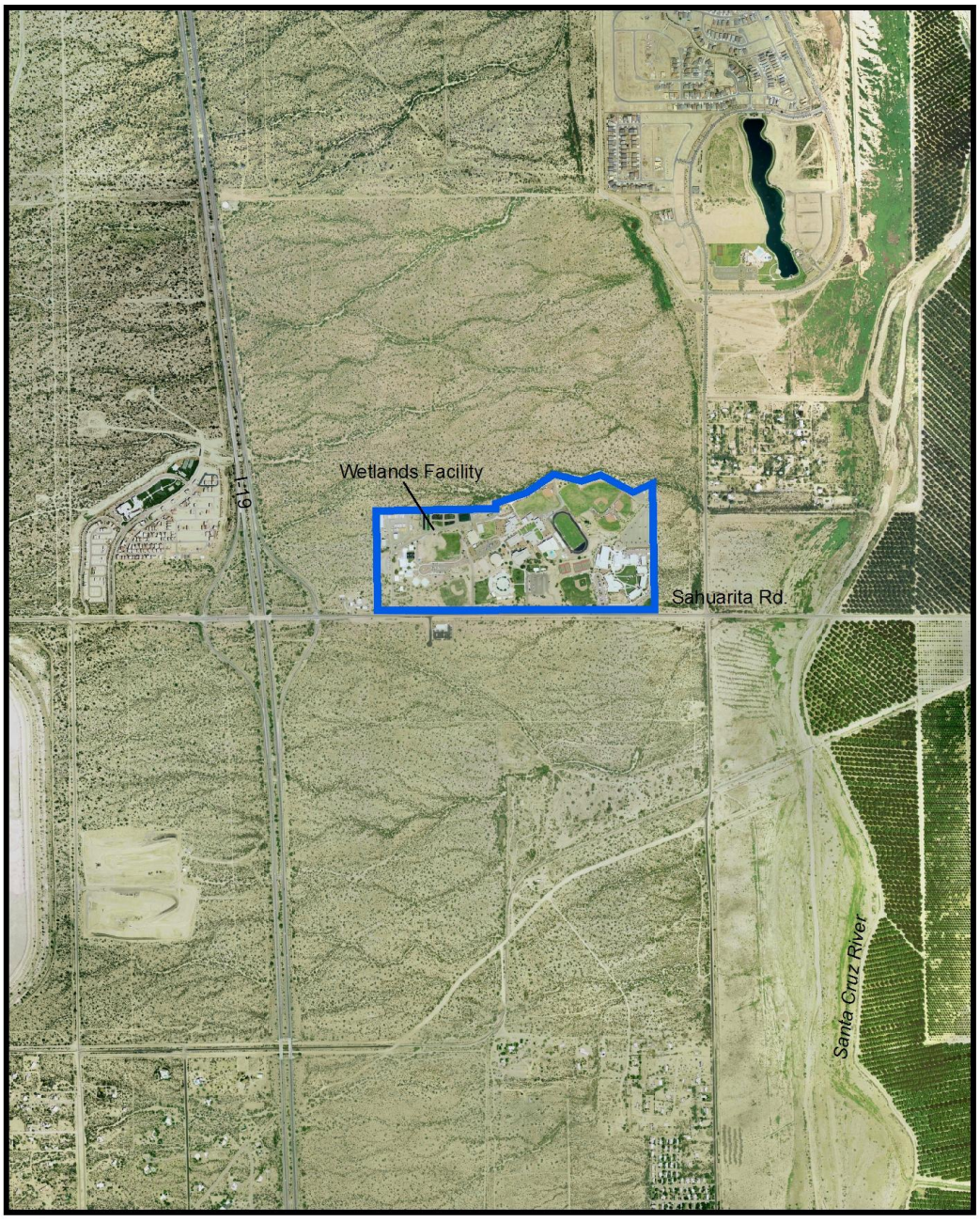


Figure 4-16. University of Arizona Science and Technology Park Service Area

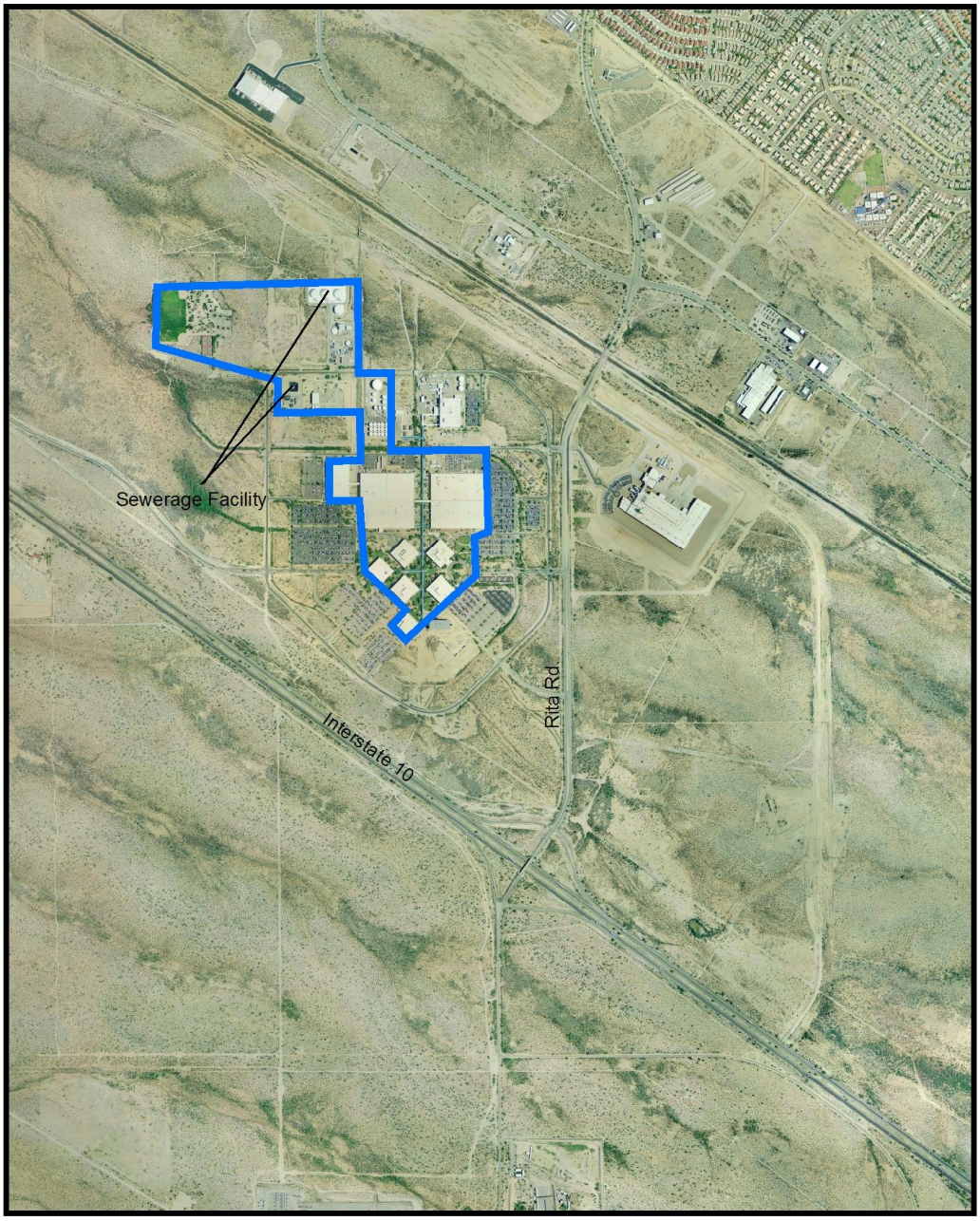
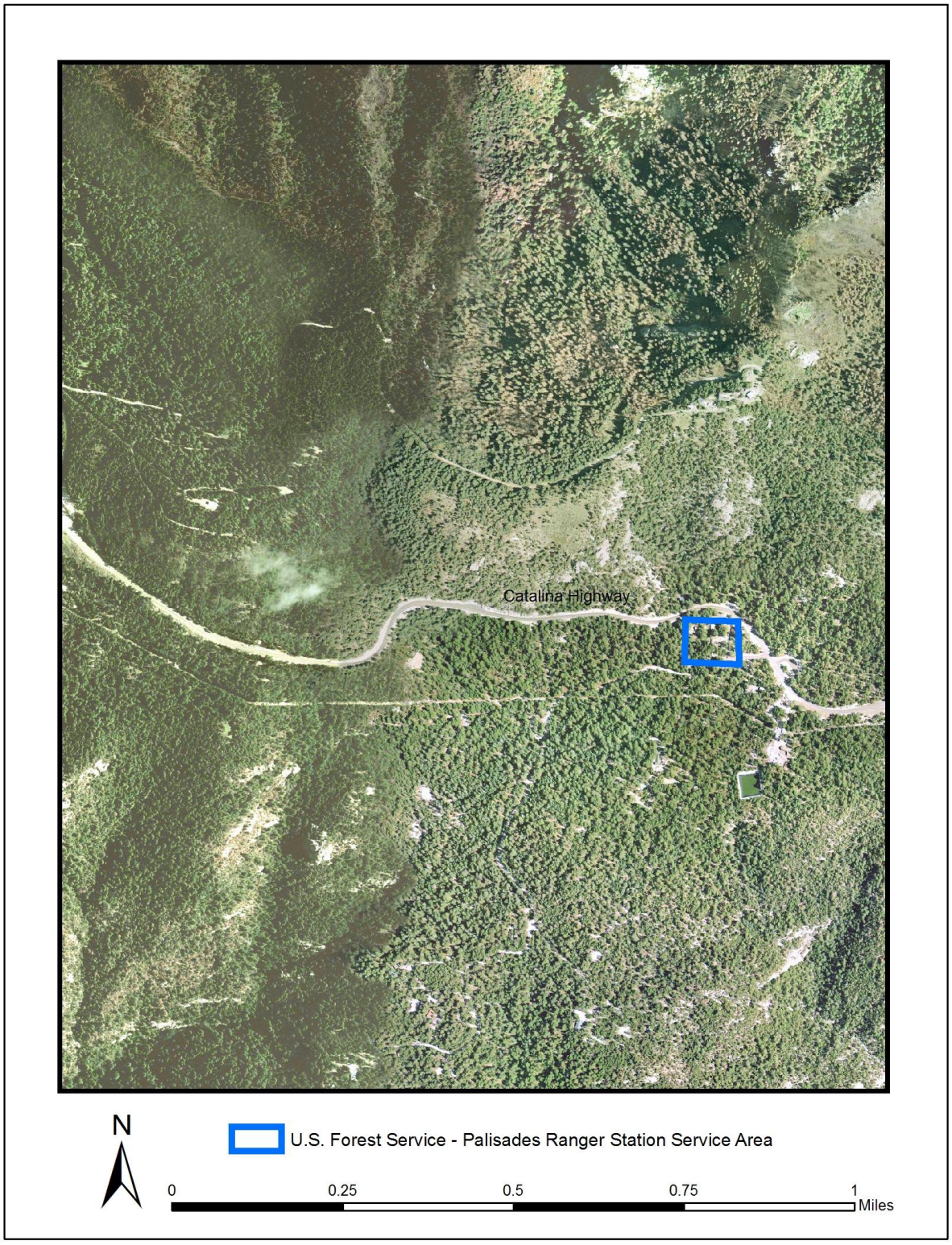


Figure 4-17. Palisades Ranger Station WWTF Service Area



5. EXISTING WASTEWATER TREATMENT FACILITIES AND OTHER POINT SOURCE NPDES DISCHARGES

All existing wastewater treatment facilities, both public and private, consistent and inconsistent with the 208 Plan, are shown on Figure 5-1.

5.1. DRAINAGE AREAS AND SUB-BASINS

Locations of wastewater treatment facilities and their corresponding sewer service areas are based in large part on topography and on proximity to demand centers (i.e., areas with high population densities). In most cases, wastewater treatment facilities are located at the "downstream" end of their sewer service areas, so that sewage can flow by gravity to the treatment facility. A lift station is needed if sewage must flow across a topographic divide, or if land surface gradients are insufficiently sloped over large lateral distances, in which case a lift station is needed to avoid placing sewer lines at great depths below land surface at their downstream end.

Because topographic constraints and the geographic distribution of population are such key factors in siting wastewater treatment facilities, Pima County is divided into a number of drainage areas or "sewer basins" for regional wastewater treatment planning purposes. These sewer basins are delineated such that it is practical for a particular treatment facility or lift station to serve the entire area within a sewer basin. The locations and boundaries of 22 wastewater drainage areas were delineated in the original 1978 PAG 208 Plan. The areas were based on natural topographic features, with the actual service areas of sewerage systems constituting only a small fraction of any drainage area.

For this update to the 208 Plan, PAG relied on sewer basins delineated by Pima County Wastewater Management Department for its Facility Plan update. These basins are shown on Figure 5-2.

5.2. METHODS FOR DELINEATING CURRENT SERVICE AREAS AND ESTIMATING SERVICE AREA POPULATION

This chapter includes descriptions of service areas for all of the public wastewater treatment facilities in Pima County. "Service area" in this chapter refers to the approximate area currently served by the facility as of the early 2000s. Service areas for private facilities are not described in this chapter; they are discussed in Chapter 4.

Service areas for public facilities were delineated using one of five methods described below.

1) Subdivision boundaries. PAG used this method for small facilities serving a clearly defined subdivision or subdivisions, based on the locations of sewer lines and subdivision boundaries. In these cases, PAG simply equated the service area to the subdivision extent of the existing sewer lines. The sewer line locations and subdivision boundaries were obtained from the Pima County Land Information System (PCLIS) GIS data set version 28. This method was used for Rillito Vista and Arivaca Junction.

Figure 5-1. Existing Wastewater Treatment Facilities in Pima County

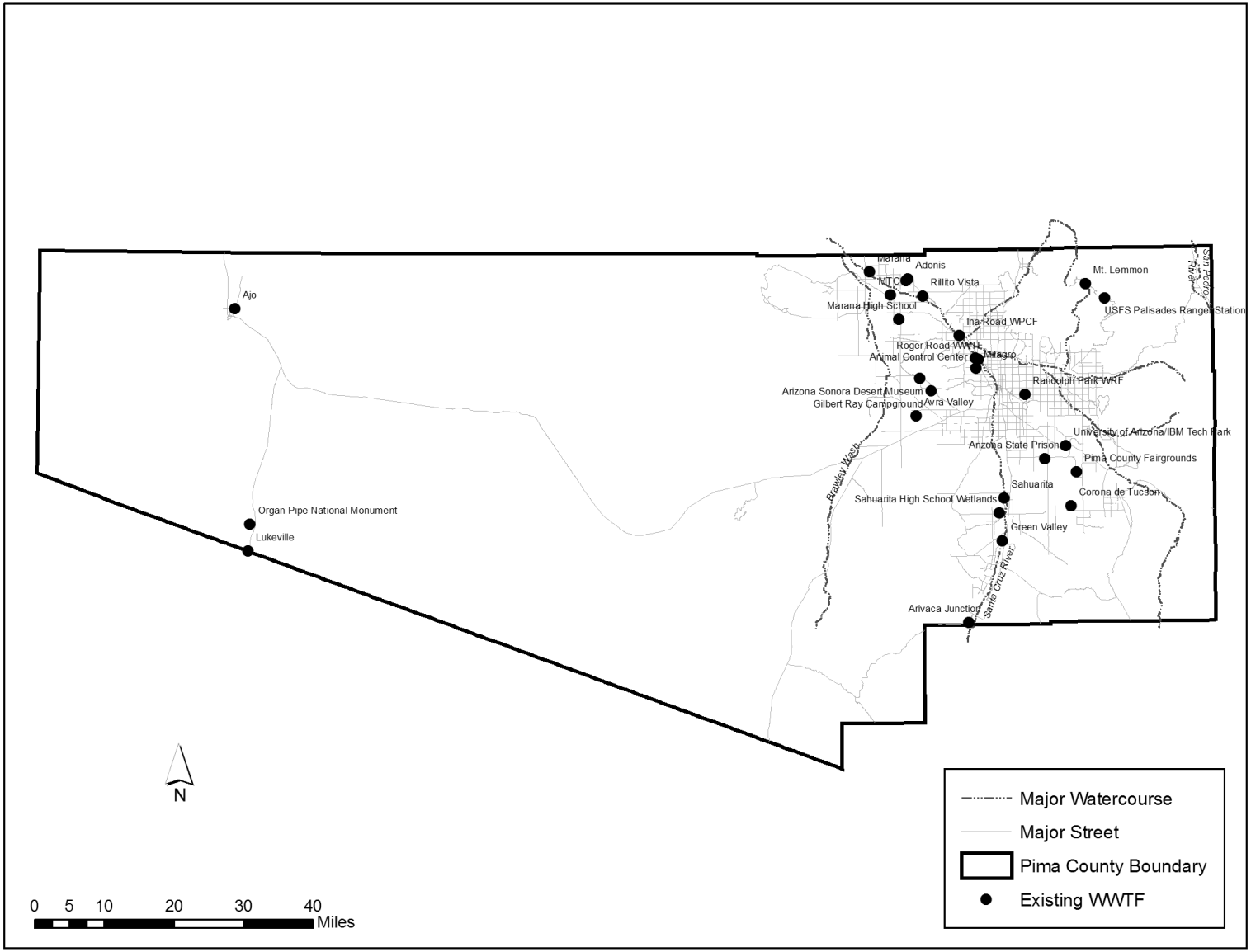
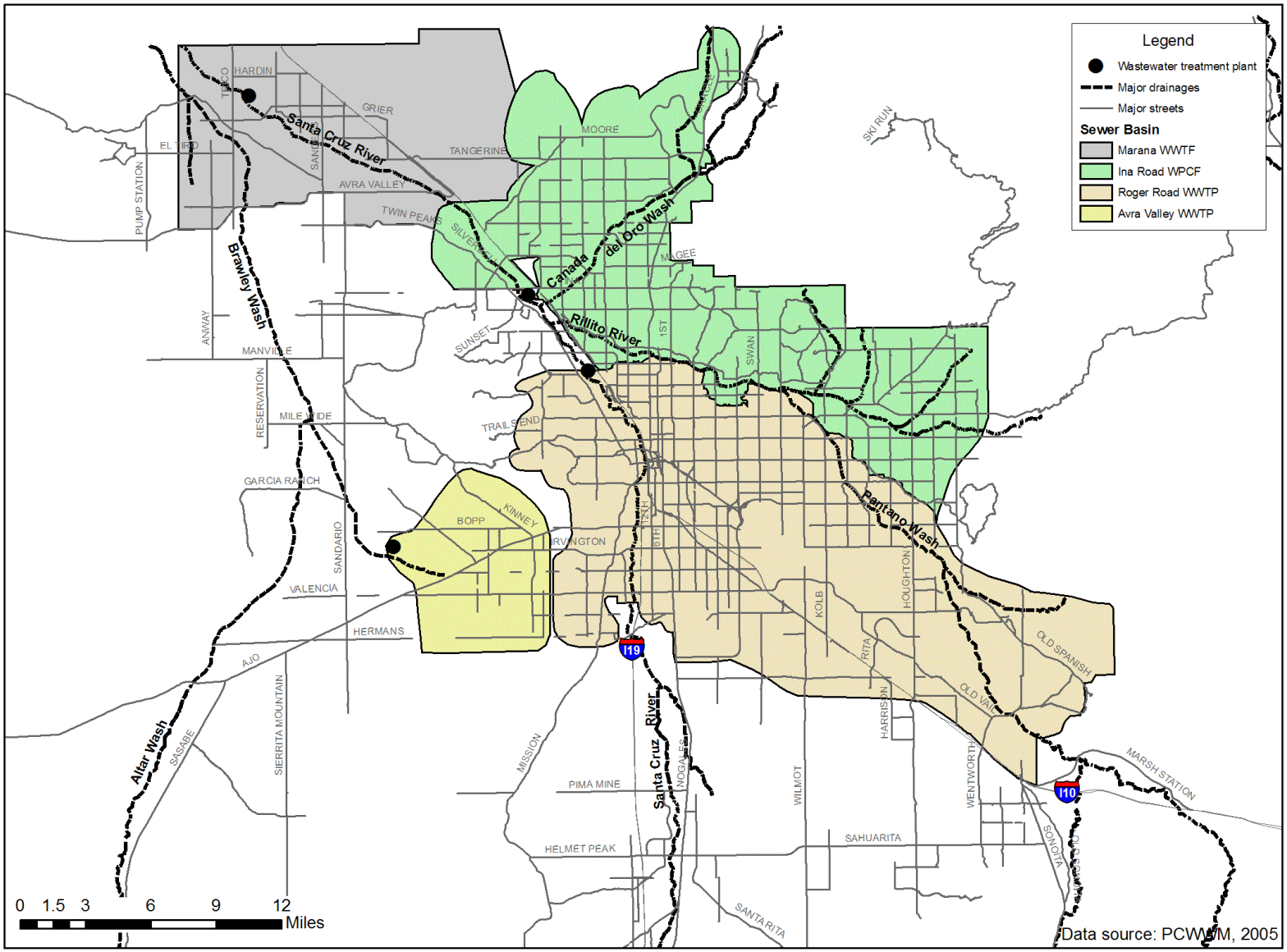


Figure 5-2. Major Pima County Sewer Basins



2) Pima County Facility Plan Update. For Roger Road, Ina Road and Avra Valley, PAG delineated the service areas using the tributary sewer sub-basins identified in the GIS shapefiles used for Pima County's draft Facility Plan Update. PAG merged all of the tributary sub-basins into one service area polygon for each of the three facilities. Only the sewer sub-basins that had existing sewer lines within them (based on a 2002 sewer line shape file in PCLIS) were included in the current service area for each facility.

3) Orthophotography. For the Fairgrounds and Desert Museum facilities, PAG delineated the service area using 2002 aerial orthophotography. The service areas encompass the buildings that are currently served by the treatment plants.

4) Orthophotography/Parcels/Sewer Lines. For the Marana, Corona de Tucson and Green Valley facilities, PAG delineated the current service area using the 2002 PCLIS sewer line shape file along with the PCLIS parcel shape file and 2002 aerial orthophotography. By overlaying the aerial photography and parcel boundaries on the sewer line map, it was possible to determine which areas were currently served by these facilities, as of 2002. For Mount Lemmon, Pima County Wastewater Management Department staff provided an aerial photograph with the parcels currently served by the Mount Lemmon facility highlighted.

   The Marana and Corona de Tucson areas in particular are experiencing rapid growth. Thus the actual 2005 service areas could be larger than what PAG delineated for these facilities.

5) Town of Sahuarita staff. For the Sahuarita facility, PAG relied on information provided by staff with the Town's public works department (Hamilton, 2005). Town staff identified the subdivisions served by the facility, and PAG used this information to delineate the service area. In addition, PAG referred to *Master Sewer Basin Study for the Sahuarita Wastewater Treatment and Reclamation Facility* (MMLA, 2003) document for existing sewer line locations to include in the current service area.

PAG did not delineate a service area for the Randolph Park Wastewater Reclamation Facility. This facility takes a portion of the wastewater flow en route to the Roger Road WWTF and treats it for reuse on turf facilities.

PAG estimated the population served by public wastewater treatment facilities using one of the following methods.

1) Pima County Wastewater Management Department Data. For the Roger Road, Ina Road and Avra Valley facilities, PAG used 2005 population estimates provided by Pima County Wastewater. Pima County Wastewater, in coordination with Tucson Water, developed these estimates for its draft Facility Plan Update. The estimates were based on projections developed at the Traffic Analysis Zone (TAZ)[3] level by PAG from the 2000 Census.

2) Full and Partial Traffic Analysis Zone (TAZ) Populations. For the Green Valley WWTF, whose service area encompasses multiple Traffic Analysis Zones (TAZ), PAG used the total PAG 2005 projected population (extrapolated from the 2000 Census) for each TAZ

[3] Traffic analysis zones are geographic areas of varying size that are delineated for the purpose of tabulating transportation-related data, such as population. See Figure 7-2 for a TAZ map.

in the service area to estimate the total service area population. In cases where a TAZ was crossed by a service area boundary, we assumed that the population was evenly distributed across the TAZ. The fraction of the TAZ population within the service area was therefore assumed to be the same as the fraction of the TAZ area within the service area. The fractional population was calculated using an ArcGIS intersection tool.

3) Full TAZ population. For the Mount Lemmon and Marana wastewater treatment facilities, whose current service areas each fall within a single TAZ, PAG assumed the service area population was the total 2005 projected population of the TAZ in which the service area was located. In these areas, the TAZ encompassing the service area was generally unpopulated or uninhabitable outside the areas currently served by the WWTF.

4) Daily Wastewater Flows. The estimated population of the Corona de Tucson WWTF service area was based on the daily flows at the facility. Population served by facility was estimated assuming a per capita volume of wastewater generation of 85 gallons per day.

5) Number of lots in subdivision(s) served. For the Rillito Vista and Arivaca Junction wastewater treatment facilities, which serve specific subdivisions, PAG used the total number of lots in the subdivisions and an average household size of 2.59 people per owner-occupied unit (from the Pima County Sonoran Desert Conservation Plan report *Housing in Pima County*, 2001) to estimate the population served.

The Desert Museum and Fairgrounds wastewater treatment facilities serve particular locations rather than areas with a permanent population. For these facilities, we did not estimate a "service area population." There is typically no permanent population served by these facilities.

5.3. PUBLIC WASTEWATER TREATMENT FACILITIES IN THE METROPOLITAN AREA

Public wastewater treatment facilities are those operated by a Designated Management Agency (DMA) – either Pima County Wastewater Management Department or the Town of Sahuarita – for purposes of treating domestic, commercial and industrial wastewater from the general public. All other facilities are considered "private" for PAG 208 planning purposes, even if they are operated by a public entity.

For this update to the 208 Plan, "public facilities in the metropolitan area" are defined as those public facilities located within the contiguous, urbanized portion of the Tucson metropolitan area: Ina Road Water Pollution Control Facility, Roger Road Wastewater Treatment Facility, and the Randolph Park Water Reclamation Facility (Figure 5-3). This definition, which is used solely for the purpose of this report, is consistent with the original PAG 208 Plan. It does not necessarily correspond to other definitions of "metropolitan area" or "metropolitan facilities." The list of metropolitan facilities might change as the metropolitan area grows and becomes more contiguous.

Principal data sources for this section include:

- *Pima County Wastewater Management Department 4 Year Review 1998-2002*;
- Pima County Wastewater Staff Report to the Wastewater Management Advisory Committee 4/21/05;
- *The Pima County Effluent Generation and Utilization Report 2004*;

- facility capacity and flow data for Fiscal Year 2003-04 provided electronically by Pima County Wastewater Management Department on April 22, 2005;
- GIS files for Pima County's draft Facility Plan Update; and
- the Pima County Land Information System GIS data set version 28.

5.3.1. Roger Road Wastewater Treatment Facility

The Roger Road Wastewater Treatment Facility was constructed in 1951 along the east side of the Santa Cruz River at roughly the Roger Road alignment (Figure 5-4). It was originally owned by the City of Tucson and remained under the City's ownership at the time the original 1978 PAG 208 Plan was adopted. However, the City transferred ownership of the Roger Road plant to Pima County in 1979 pursuant to an Intergovernmental Agreement (IGA), consistent with the recommendations of the original 208 Plan and EPA's desire for consolidation of the metropolitan sewerage system.

5.3.1.1. Service area boundaries

The Roger Road WWTF service area (Figure 5-4) encompasses most of the City of Tucson and most of the major Tucson metropolitan area. It extends from the Tucson Mountains on the west, to roughly Rillito Creek on the north, to the Rincon Mountains on the east, and continues south beyond the current City limits. The Ina Road WPCF service area lies to the north of the Roger Road service area.

5.3.1.2. Service area population

The population served by the Roger Road WWTF in 2005 is 497,039, based on PAG 2005 population projections at the TAZ level, as assigned to tributary sewer-basins by Pima County Wastewater for its Facility Plan update.

5.3.1.3. Service area land uses

Based on current zoning, land uses in the Roger Road WWTF service area consist of 69.5 percent residential, 17 percent industrial, 6.5 percent commercial, 3.8 percent specific plan, 1.4 percent federal and state land and 0.8 percent multiple use.

5.3.1.4. Treatment method

The Roger Road facility's treatment process consists of: headworks for initial screening of large materials and settling out of heavy sand and rocks; clarifiers to separate sludge and scum; biotowers to remove suspended particles by biological treatment; and chlorination.

5.3.1.5. Discharge method and location

Effluent is discharged to the Santa Cruz River in accordance with an AZPDES permit and Aquifer Protection Permit. Effluent is also reused for turf irrigation and other purposes, primarily through the City of Tucson's reclaimed water system which includes additional treatment before distribution to customers. Biosolids are conveyed to the Ina Road Water Pollution Control Facility for processing.

5.3.1.6. Capacity

The Roger Road facility's rated capacity is 41 MGD.

5.3.1.7. Current flows

The Roger Road plant received flows averaging 37 MGD during Fiscal Year 2003-2004.

Figure 5-3. Public Metropolitan Wastewater Treatment Facilities

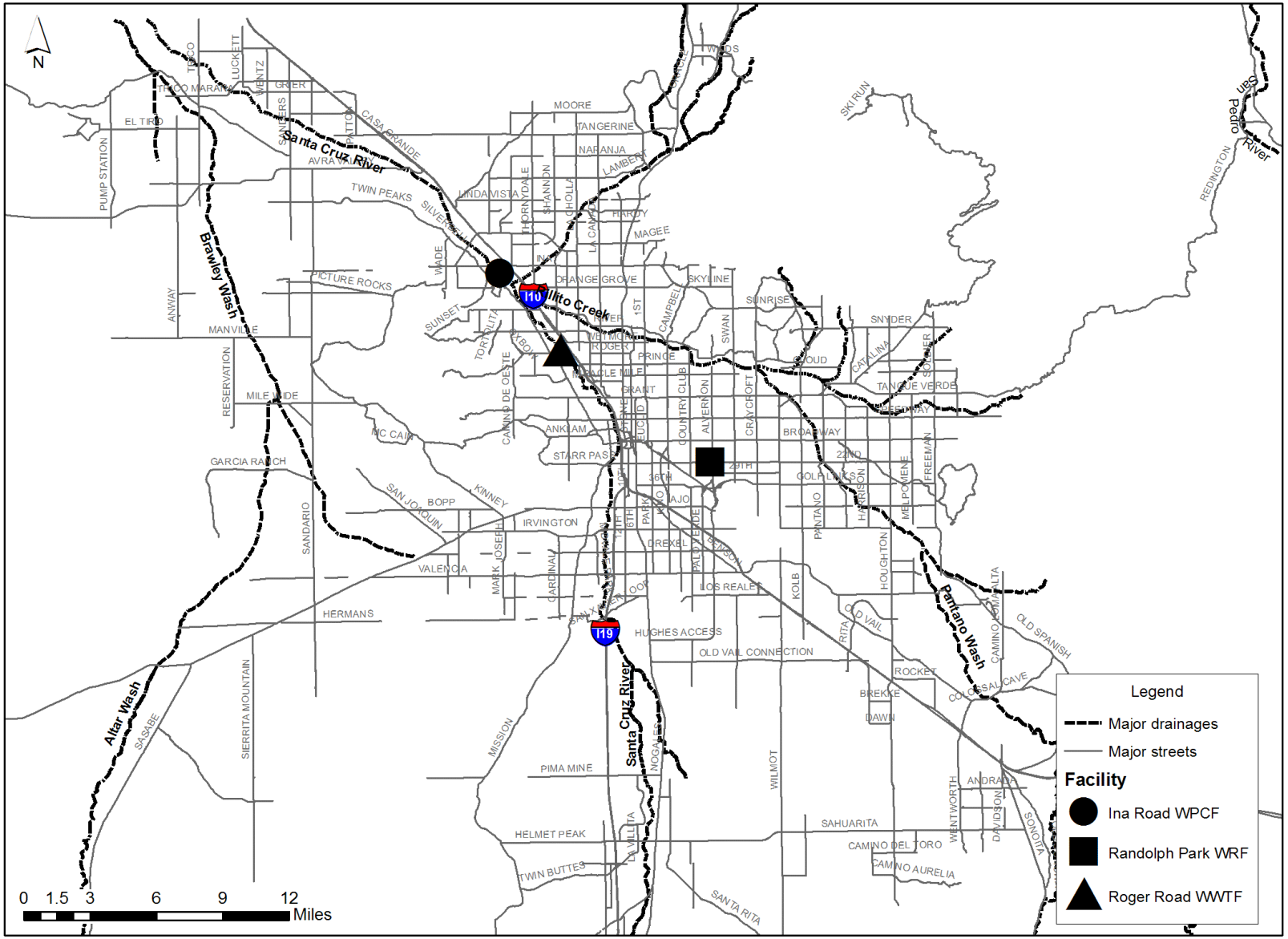
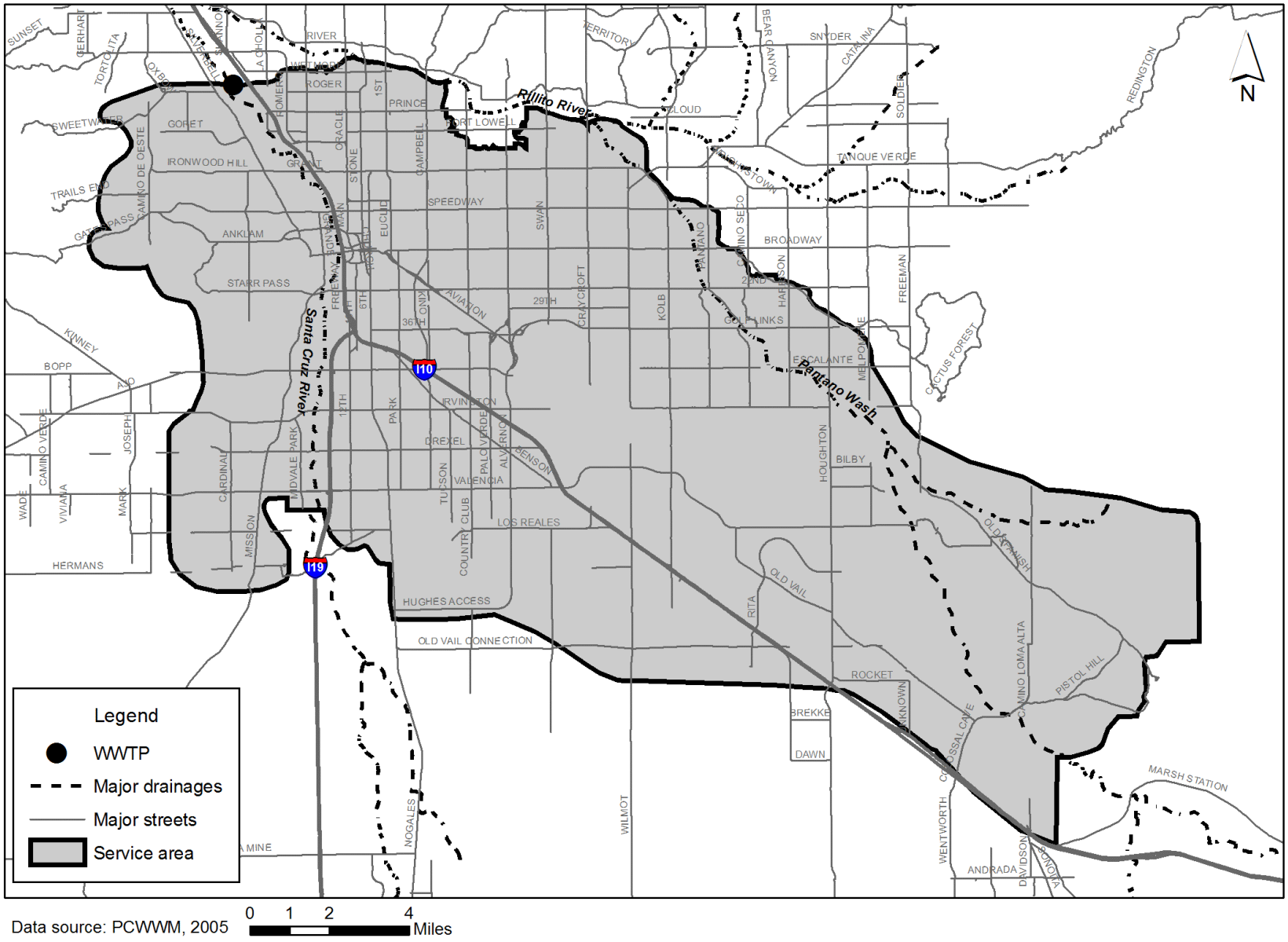


Figure 5-4. Roger Road WWTP Current (2005) Service Area



5.3.2. Ina Road Water Pollution Control Facility

The Ina Road Water Pollution Control Facility began operation in 1977. The facility has always been owned by Pima County. It is located on the east side of the Santa Cruz River, south of Ina Road (Figure 5-5).

5.3.2.1. Service area boundaries

The Ina Road facility serves the Catalina foothills, the far northeast part of the Tucson metropolitan area, much of the urbanized part of the lower Canada del Oro watershed and Oro Valley, and southern Marana. The approximate, current service area boundaries are shown on Figure 5-5. Wastewater from the Continental Ranch area is conveyed to the Ina Road WPCF via the Continental Ranch Pump Station. Wastewater from areas along the lower slopes of the Tortolita Mountains is conveyed to Ina via the Tortolita Mountain Pump Station and the Camino de Oeste interceptor.

5.3.2.2. Service area population

The population served by the Ina Road Water Pollution Control Facility is 217,888, based on PAG 2005 population projections at the TAZ level, as assigned to tributary sewer-basins by Pima County Wastewater for their Facility Plan update.

5.3.2.3. Service area land uses

Based on current zoning, land uses in the Ina Road WWTF service area consist of 85.5 percent residential, 7.2 percent specific plan, 3.4 percent commercial, 3.3 percent open space, 3 percent multiple use, 0.7 percent agriculture, 0.07 percent federal and state land, and 0.02 percent rural commercial.

5.3.2.4. Treatment method

Ina Road's treatment processes include high purity oxygen activated sludge for the 25 MGD treatment train and biological nutrient removal activated sludge for the 12.5 MGD treatment train currently under construction.

The existing facility consists of the following wet stream treatment units and processes (Malcolm Pirnie, 2000):

- emergency wastewater holding ponds
- influent screening
- influent pumping
- grit removal
- primary sedimentation
- activated sludge using high-purity oxygen
- final sedimentation
- chlorine disinfection
- chlorine reduction

and the following treatment for biosolids:

- gravity thickening
- flotation thickening
- anaerobic digestion
- sludge dewatering

5.3.2.5. Discharge method and location

Effluent is discharged to the Santa Cruz River in accordance with an AZPDES permit and Aquifer Protection Permit. Biosolids from both Ina Road and Roger Road are centrifuged at the Ina Road facility and applied to agricultural fields under contract to a private firm. A small amount of effluent is reused at the Arthur Pack golf course (581.4 acre-feet in 2004) and for on-site irrigation (Pima County WWM, 2005a).

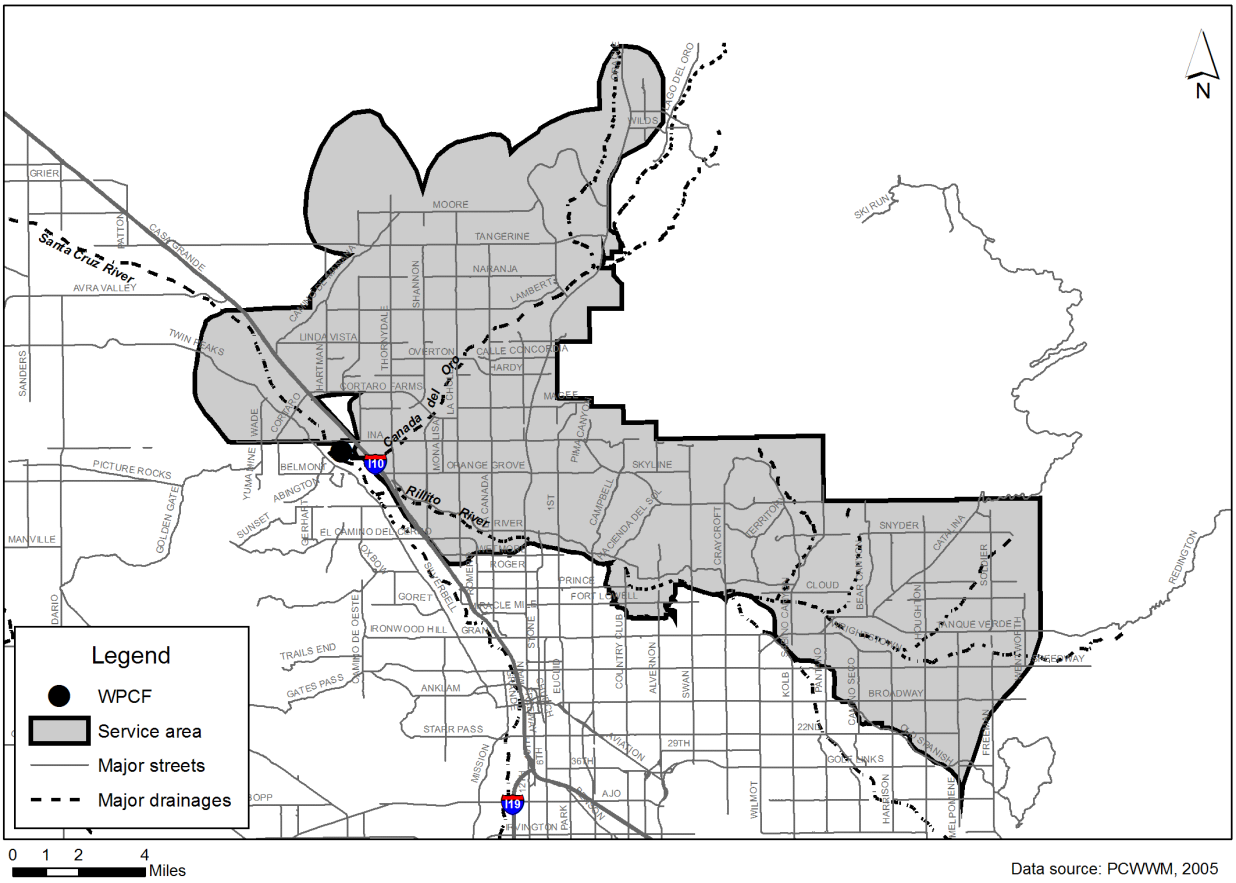
5.3.2.6. Capacity

The current capacity is 25 MGD, with an expansion to 37.5 MGD using a new 12.5 MGD biological nutrient removal system expected to be completed in the near future.

5.3.2.7. Current flows

Average daily inflow of influent is approximately 25 MGD.

Figure 5-5. Ina Road Water Pollution Control Facility Current (2005) Service Area



5.3.3. Randolph Park Wastewater Reclamation Facility

The original Randolph Park WRF was put into operation in 1975. It was temporarily removed from active service in 1995. A replacement facility has been constructed and has resumed operation. The facility is owned by Pima County.

5.3.3.1. Service area boundaries

This facility treats wastewater en route to the Roger Road facility. The treated effluent is reused on turf facilities. PAG did not delineate a service area for this facility.

5.3.3.2. Service area population

PAG did not estimate a service area population for this facility. Its service area lies within that of the Roger Road facility.

5.3.3.3. Service area land uses

The area tributary to Randolph Park is within the Roger Road service area.

5.3.3.4. Treatment method

The Randolph Park treatment method is described as follows in *The Pima County Effluent Generation and Utilization Report 2004* (Pima County WWM, 2005a):

> *Influent to the WRF is processed through a series of mechanically mixed anoxic basins. Effluent from these basins enters a mixed-liquor channel where it is distributed to six parallel aeration and membrane bioreactor cassette basins. Activated sludge is returned to the cassette basin for reuse, while skimmed solids and excess activated sludge are pumped through a force main. Effluent is disinfected through an in-vessel, low-pressure, high-output, ultraviolet disinfection system.*

5.3.3.5. Discharge method and location

Effluent is reused on the adjacent Randolph Park, Randolph Golf Course and Dell Urich Golf Course, and is delivered into the City of Tucson's reclaimed water system. The Tucson Reclaimed Water Plant is located near Pima County's Roger Road facility.

5.3.3.6. Capacity

The facility is currently rated at 3.0 MGD.

5.3.3.7. Current flows

Flows were 1.4 MGD to 1.6 MGD as of September 2005 (Tucson Water, 2005).

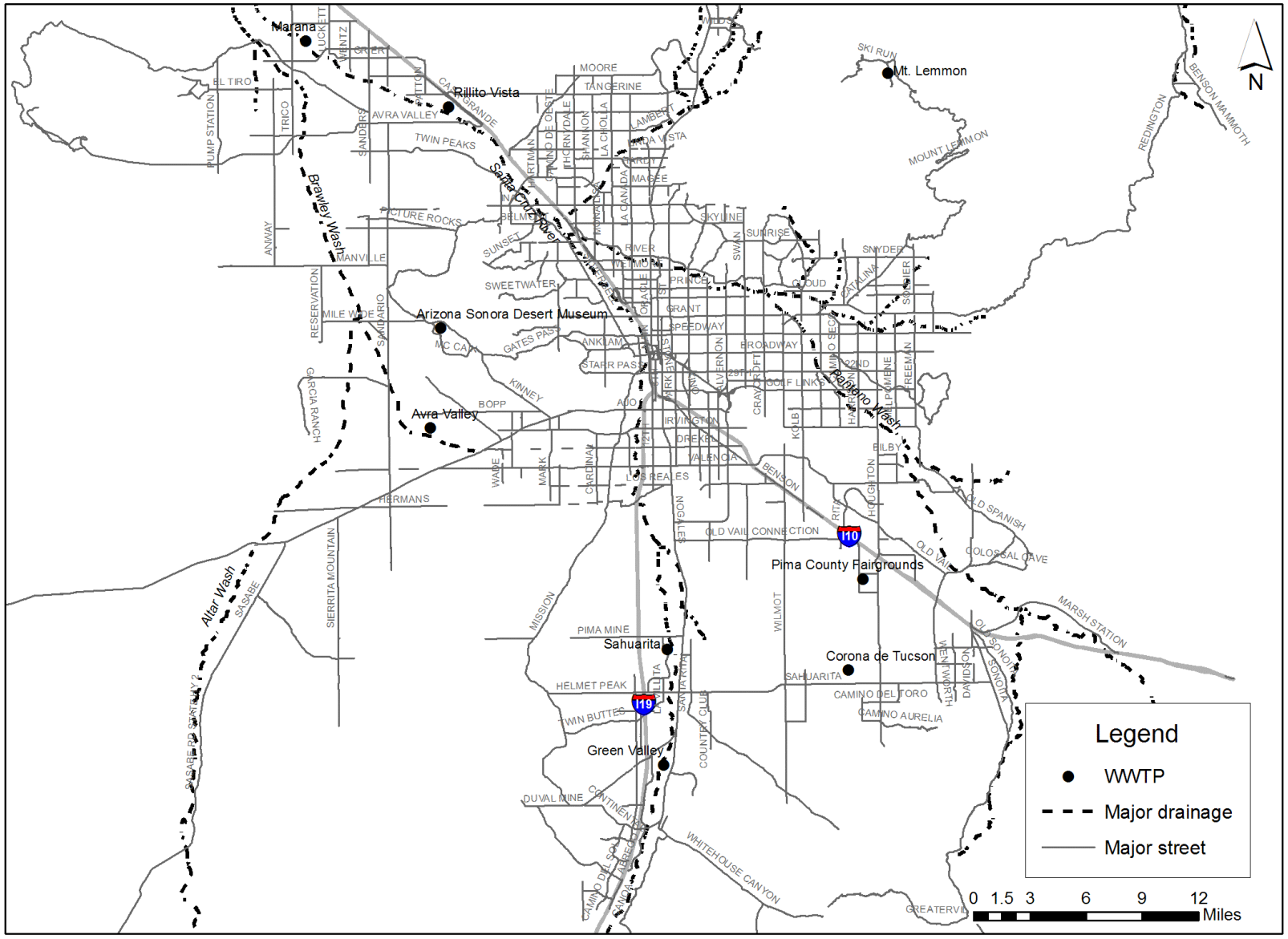
5.4. PUBLIC WASTEWATER TREATMENT FACILITIES OUTSIDE THE METROPOLITAN AREA

This section discusses existing wastewater treatment facilities other than the Roger Road, Ina Road and Randolph Park facilities. Only publicly owned facilities (i.e., those owned by Pima County or the Town of Sahuarita) are included in this section, and are shown on Figure 5-6.

Principal data sources for this section include:

- *Pima County Wastewater Management Department 4 Year Review 1998-2002*;
- Pima County Wastewater Staff Report to the Wastewater Management Advisory Committee 4/21/05;
- *The Pima County Effluent Generation and Utilization Report 2004*;
- facility capacity and flow data for Fiscal Year 2003-04 provided electronically by Pima County Wastewater Management Department on April 22, 2005;
- facility data provided electronically by the Town of Sahuarita on April 27, 2005;
- GIS files for Pima County's draft Facility Plan Update; and
- the Pima County Land Information System GIS data set version 28.

Figure 5-6. Public Non-Metropolitan Wastewater Treatment Facilities



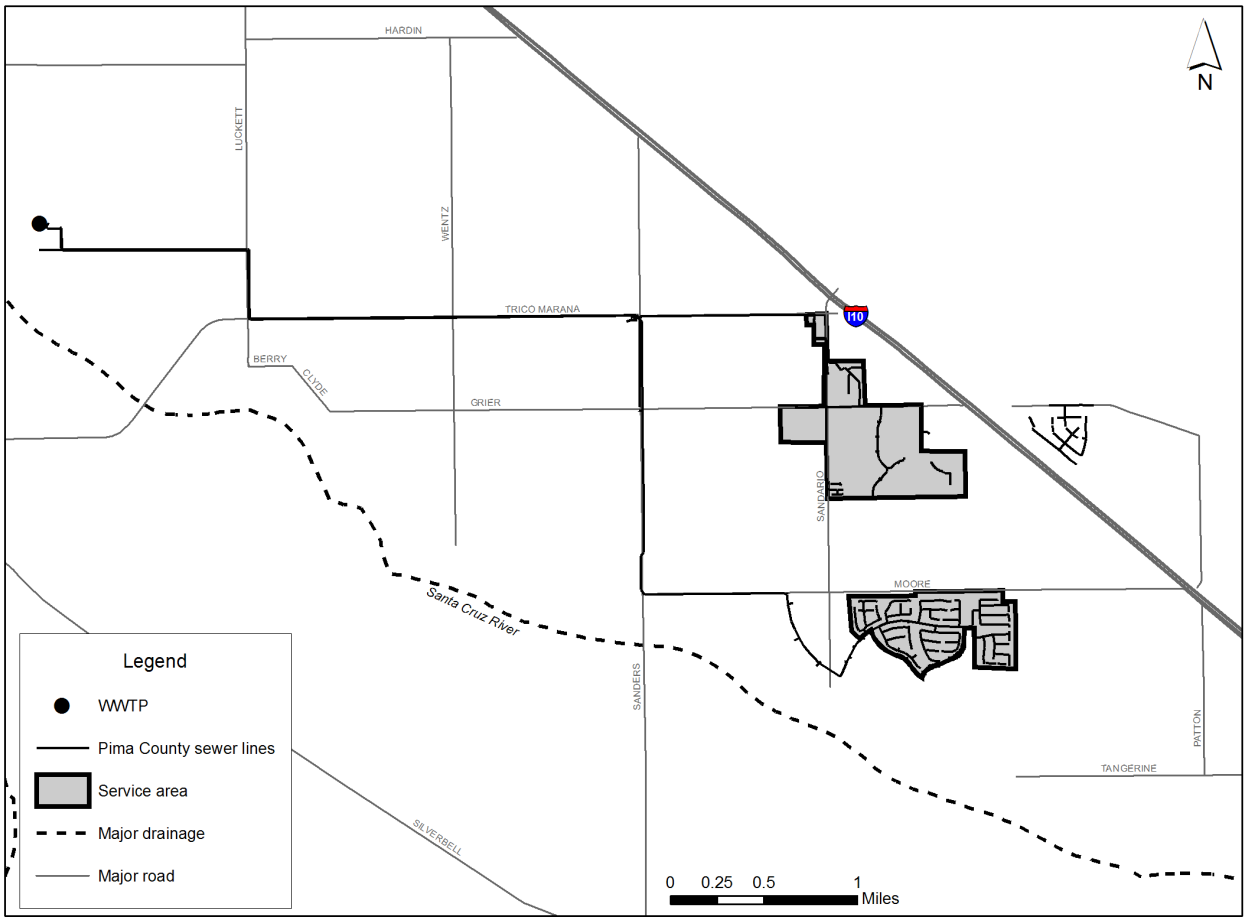
5.4.1. Marana Wastewater Treatment Facility

The Marana WWTF is located one-half mile east of the Santa Cruz River, in an agricultural area three miles west of Marana (Figure 5-7). The facility is one-half mile north of Marana Road and one mile west of Luckett Road, in Township 11 South, Range 10 East, Section 14. The facility, which has been owned by Pima County since 1980, previously consisted only of two ponds operating in series. The 2000 Marana 208 Update stated that average flows at that time were 27,000 gallons per day from approximately 100 residential and fewer than 10 commercial dischargers. Since that time, the facility has been expanded to include three package treatment plants, each rated at 50,000 GPD.

5.4.1.1. Service area boundaries

The Marana WWTF currently serves a relatively small area in Marana (Figure 5-7). Areas served include residential areas in central Marana (north and south of Grier Road, east of Sanders Road) and the new Gladden Farms development south of Moore Road and east of Sanders Road. As of early 2005, there also were plans for constructing sewers to serve the existing Honea Heights subdivision (Town of Marana, 2005), which was previously served by individual on-site systems. Honea Heights is located north of the Santa Cruz River, east of Sanders Road.

Figure 5-7. Marana WWTP Current (2002) Service Area



5.4.1.2. Service area population

The projected 2005 population for the TAZ in which the service area is located is 2616.

5.4.1.3. Service area land uses

Land use in the service area is primarily residential, consisting of 66 percent small lots (< 2.5 acres, mixed use): and 21 percent medium lots (between 2.5 and 25 acres, mixed use). Approximately 12 percent of the service area corresponds to a specific plan. Only 0.4 percent is zoned commercial. The surrounding area is mostly farmland.

5.4.1.4. Treatment method

The Marana WWTF consists of three 50,000 GPD Smith and Loveless biological nutrient removal package treatment plants. The facility also has two lined facultative/evaporative basins, one of which is used as an overflow basin.

5.4.1.5. Discharge method and location

Effluent is discharged to the Santa Cruz River via an AZPDES permit or reused on site.

5.4.1.6. Capacity

As of December 2005, four package plants had been installed, raising the capacity of the Marana facility to 0.2 MGD. Replacement of the existing package plants with a new 0.5 MGD facility is expected in 2006, followed by a new 1.5 MGD BNROD facility in 2007.

5.4.1.7. Current flows

Average daily flow in FY2003-04 was 0.04475 MGD.

5.4.2. Avra Valley Wastewater Treatment Facility

The Avra Valley WWTF is owned and operated by Pima County. It is located approximately 20 miles southwest of Tucson in southern Avra Valley, north of Highway 86 and east of Three Points (Figure 5-8). This is a semi-rural but rapidly growing area.

5.4.2.1. Service area boundaries

The current service area for the Avra Valley WWTF (Figure 5-8) is roughly centered on the intersection of Highway 86 (Ajo Way) and San Joaquin Road. From this point the service area extends roughly four miles to the north, four miles to the south, four miles to the west and three miles to the east.

5.4.2.2. Service area population

The estimated population served by the Avra Valley WWTF in 2005 was 12,104.

5.4.2.3. Service area land uses

Land uses in the service area include rural residential (70.7 percent), urban residential (9.4 percent), commercial (1.5 percent), industrial (1.7 percent), multiple use (1.0 percent), specific plan (4.7 percent), and federal and state land (10.9 percent).

5.4.2.4. Treatment method

This facility uses a biological nutrient removal, oxidation ditch (BNROD) treatment process. The process is described in *The Pima County Effluent Generation and Utilization Report 2004* (Pima County WWM, 2005a) as follows:

> *Influent is equalized in a 1.37 million gallon basin prior to being pumped to a channel that discharges into the 1.2 MGD oxidation ditch. The process is based on extended*

aeration, nitrification, and de-nitrification within the oxidation ditch by cycling the aeration on and off. The activated sludge mixed liquor flows into two secondary clarifiers…. The clarifiers are designed to provide quiescent conditions for the sludge to settle.

Figure 5-8. Avra Valley WWTP Current (2005) Service Area

5.4.2.5. Discharge method and location

Effluent disposal consists of on-site irrigation reuse, evaporation, percolation, and discharge to Black Wash via a spray field in accordance with an AZPDES permit. Use of effluent for a riparian restoration project has been proposed. According to Pima County Wastewater (2005a), sludge is returned to the oxidation ditch or wasted to thickeners and then stored in drying beds.

5.4.2.6. Capacity

The current design capacity of the Avra Valley WWTF is 1.2 MGD (Pima County WWM, 2005b).

5.4.2.7. Current flows

Average daily flow for March 2005 was 1.016 MGD (Pima County WWM, 2005b).

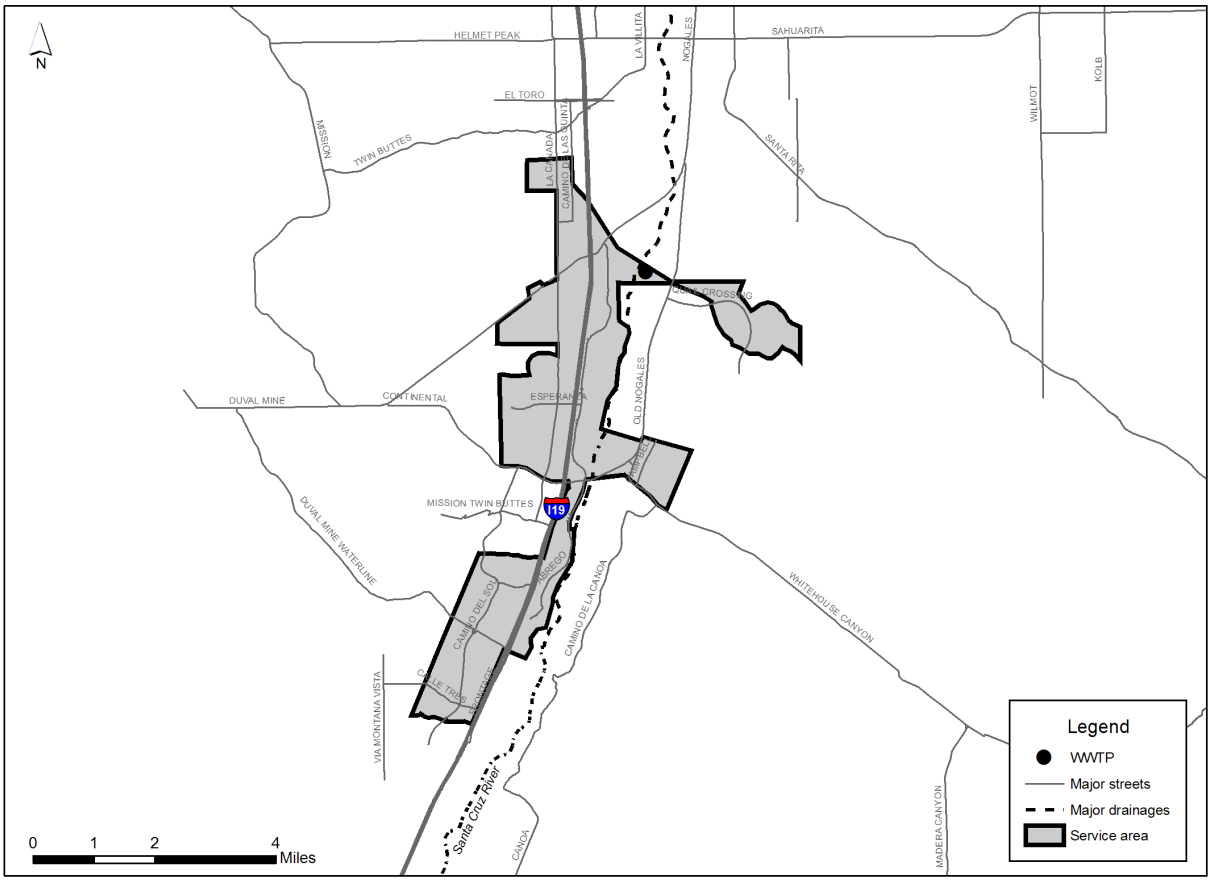
5.4.3. Green Valley Wastewater Treatment Plant

The Green Valley WWTP is south of Tucson along the east side of the Santa Cruz River (Figure 5-9). It serves the retirement community of Green Valley and a small southern part of the Town of Sahuarita. It is owned and operated by Pima County.

5.4.3.1. Service area boundaries

The Green Valley WWTP service area (Figure 5-9) extends along both sides of Interstate 19, primarily serving properties west of the Santa Cruz River, but also some properties east of the river. The service area extends roughly 9.5 miles north to south, from about a half-mile south of Twin Buttes Road, to about a mile and a half south of the Duval Mine water line road. Along most of its length, the current service area is between one and four miles wide from east to west.

Figure 5-9. Green Valley WWTP Current (2002) Service Area



5.4.3.2. Service area population

The estimated 2005 service area population is 17,469.

5.4.3.3. Service area land uses

Most of the service area is the retirement community of Green Valley. The facility also serves parts of the Town of Sahuarita. Land use in the service area is primarily residential and commercial.

5.4.3.4. Treatment method

The Green Valley WWTP has two treatment trains with a common headworks consisting of automatic screens and degritting. The two treatment trains are described in *The Pima County Effluent Generation and Utilization Report 2004* (Pima County WWM, 2005a) as follows:

The first (process) *is a 2.1 MGD treatment process made up of two trains of primary and secondary aerated lagoons followed by two effluent maturation/settling lagoons and four percolation basins. This treatment process produces Class B effluent. The second process is a 2.0 MGD Biological Nutrient Removal Oxidation Ditch (BNROD), which operates on an extended aeration, nitrification, and denitrification process within the oxidation ditch by cycling the aeration on and off. The activated sludge mixed liquor flows into two secondary clarifiers. Sludge is returned to the oxidation ditch or wasted solids management facilities onsite. Clarified effluent is then filtered and disinfected. This treatment process produces Class A+ effluent.*

5.4.3.5. Discharge method and location

Effluent is delivered to the Robson Quail Creek recharge basins. Effluent also is disposed via percolation and reused on-site. The County also has entered into an agreement with ASARCO to use biosolids for reclamation of mine tailings (Pima County WWM, 2005b).

5.4.3.6. Capacity

The facility's design capacity is 4.1 MGD. The new BNROD treatment train has a capacity of 2.0 MGD. The older aerated lagoon system has a capacity of 2.1 MGD.

5.4.3.7. Current flows

Average inflow in FY 2003-04 was 1.63 MGD.

5.4.4. Corona De Tucson Wastewater Treatment Facility

The Corona de Tucson WWTF is located southeast of Tucson (Figure 5-10) in an area that is currently rural but facing very rapid population growth. The plant site is northwest of the intersection of Sahuarita Road and Houghton Road. It is owned and operated by Pima County Wastewater Management Department. Because of rapid growth in the area, and forecasts that the rapid growth will continue, this facility was the subject of a PAG 208 Consistency Report approved by the Regional Council in December 2004.

5.4.4.1. Service area boundaries

As of 2002, the only areas served by the Corona de Tucson WWTF were south of Sahuarita Road, including parts of the Santa Rita Ranch, Santa Rita Bel Air Estates and New Tucson subdivisions east of Houghton Road and a small part of the New Tucson subdivision west of Houghton Road (Figure 5-10). The service area has since expanded and continues to expand.

5.4.4.2. Service area population

The population served by the Corona de Tucson facility is rather small but expected to grow rapidly. The 2000 Census showed a population of 993 for the Traffic Analysis Zones in which the service area is located. The 2005 PAG population projections for these zones indicate a population of 3,396.

Average annual daily flows at the facility were 0.058 MGD in 2002 and 0.065 in 2003 (Pima County WWM and PAG, 2004). Assuming an average of 85 gallons of wastewater generated per person per day, this translates to a service area population of 682 in 2002 and 765 in 2003.

5.4.4.3. Service area land uses

Land uses include residential (48.1 percent), commercial (7 percent), multiple use (12.9 percent), and specific plan (31.7 percent).

5.4.4.4. Treatment method

As of December 2004, when the PAG Regional Council approved a 208 Consistency Report for a facility expansion, the Corona de Tucson WWTF consisted of two facultative stabilization lagoons operating in series. However, plans were already under way at that time to upgrade the facility by installing an aeration system and implementing soil aquifer treatment to expand the treatment capacity to 300,000 GPD. Aerators already had been installed as of April 2005.

5.4.4.5. Discharge method and location

As of December 2004, discharge consisted of evaporation. Discharge via soil aquifer treatment will commence after approval of the new APP for the upgraded facility.

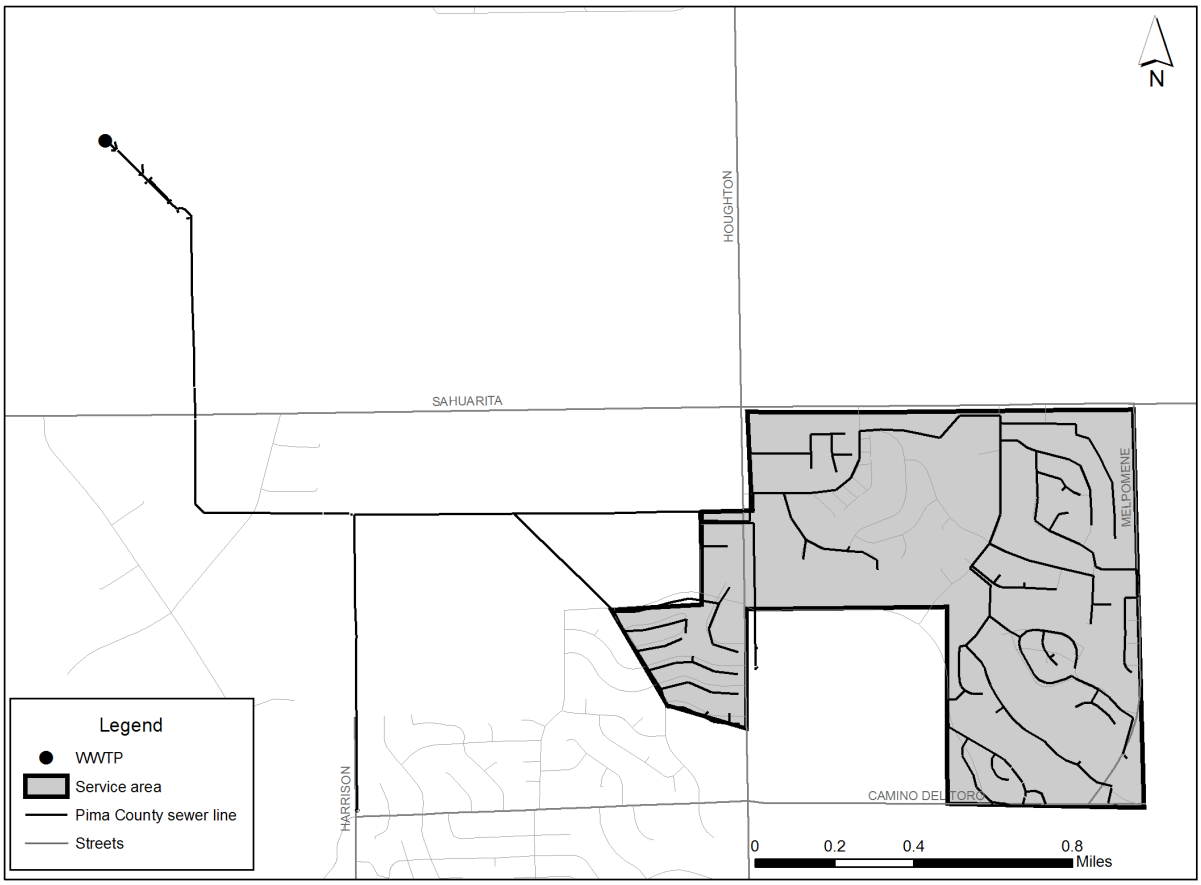
5.4.4.6. Capacity

This facility previously had a design capacity of 0.117 MGD. Minor modifications have expanded the capacity to 0.300 MGD, pending approval of an APP for the increased capacity.

5.4.4.7. Current flows

Average daily flow in FY2003-04 was 0.064 MGD.

Figure 5-10. Corona de Tucson WWTF Current (2002) Service Area



5.4.5. Mount Lemmon Wastewater Treatment Facility

The Mount Lemmon WWTF is owned and operated by Pima County Wastewater Management Department. It is located near the small community of Summerhaven on Mount Lemmon, north of Tucson.

The facility was constructed by Pima County in 1982 after a series of events in the late 1970s and early 1980s. Sabino Creek, a popular recreation area with headwaters on Mount Lemmon, was polluted in the 1970s. Marshall Gulch picnic ground was closed in 1975 because of the pollution, the major source of which was attributed to the discharge of inadequately treated sewage (PAG, 1977). Pima County and the Arizona Department of Health Services agreed on a Stipulation of Facts and Consent Order related to the water quality situation in July 1980. The Consent Order required construction of a new wastewater treatment facility. In April 1981, the State issued a prohibition against the surface discharge of treated wastewater into Sabino Creek, thus forcing the County to find a different disposal site for treated effluent. In September 1981 the PAG Regional Council approved a 208 Plan Amendment that recommended construction of a new wastewater treatment plant that would discharge on National Forest land in the San Pedro River watershed, and limiting sewerage service to only the 47 properties the County was obligated to serve at that time (PAG, 1977; PAG, 1981). The U. S. Forest Service has since approved an additional 30 connections, provided the daily average flows do not exceed 12,500 GPD average flow and 17,000 GPD daily maximum flow (Pima County WWM, 2005b).

5.4.5.1. Service area boundaries

The Mount Lemmon WWTF service area illustrated on Figure 5-11 is within the community of Summerhaven. Only a small number of the lots (77) can be served pursuant to an agreement between Pima County and the USFS.

5.4.5.2. Service area population

The 2005 population estimate for the TAZ encompassing Summerhaven was 132. The TAZ includes all of Summerhaven and vacant USFS land. As noted above, only 77 lots can be served by this facility, based on agreements with the USFS.

5.4.5.3. Service area land uses

The service area is primarily residential, with a few commercial customers such as restaurants and gift shops. The service area was severely impacted by the 2003 Aspen fire, with most of the buildings in Summerhaven destroyed. The WWTF itself was spared.

5.4.5.4. Treatment method

The facility uses an oxidation ditch for treatment (Pima County WWM, 2005a).

5.4.5.5. Discharge method and location

Effluent disposal consists of spray irrigation on 10 acres of vacant USFS land on the San Pedro River watershed side of Mount Lemmon. The disposal area burned in the 2002 Bullock Fire, causing some damage to the disposal system. The damage has since been repaired.

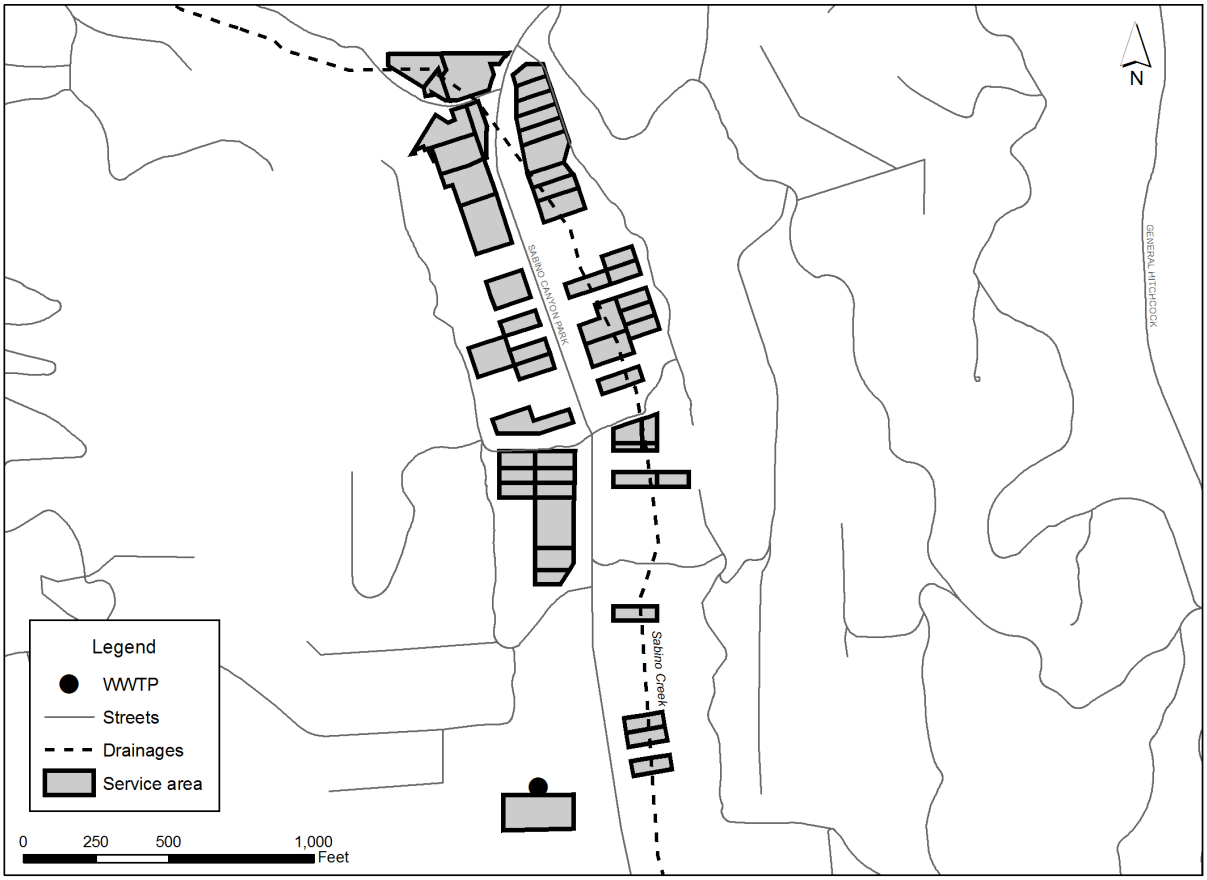
5.4.5.6. Capacity

The current capacity of the Mount Lemmon facility is 0.015 MGD.

5.4.5.7. Current flows

Average daily flow in FY2003-04 was 0.00162 MGD. Flows are currently minimal as a result of the 2003 Aspen fire that destroyed most of the residential area served by the facility.

Figure 5-11. Mount Lemmon WWTF Current (2005) Service Area



5.4.6. Arivaca Junction Wastewater Treatment Facility

The Arivaca Junction WWTF is located approximately 30 miles south of Tucson, near the Santa Cruz County line, west of the Santa Cruz River. It is owned and operated by Pima County and serves a rural area.

5.4.6.1. Service area boundaries

The Arivaca WWTF service area (Figure 5-12) encompasses a small rural residential area west of I-19 and north of Arivaca Road.

5.4.6.2. Service area population

The Arivaca Junction service area encompasses 323 lots. This corresponds to a service area population of 840 people, assuming 2.59 persons/household.

5.4.6.3. Service area land uses

The service area for this facility is entirely residential.

5.4.6.4. Treatment method

The facility consists of a single 3.2 acre, 15-foot-deep, unlined, partially mixed aerated lagoon (Pima County WWM, 2005a).

5.4.6.5. Discharge method and location

Effluent disposal consists of evaporation, percolation, and reuse at the Reventone Ranch.

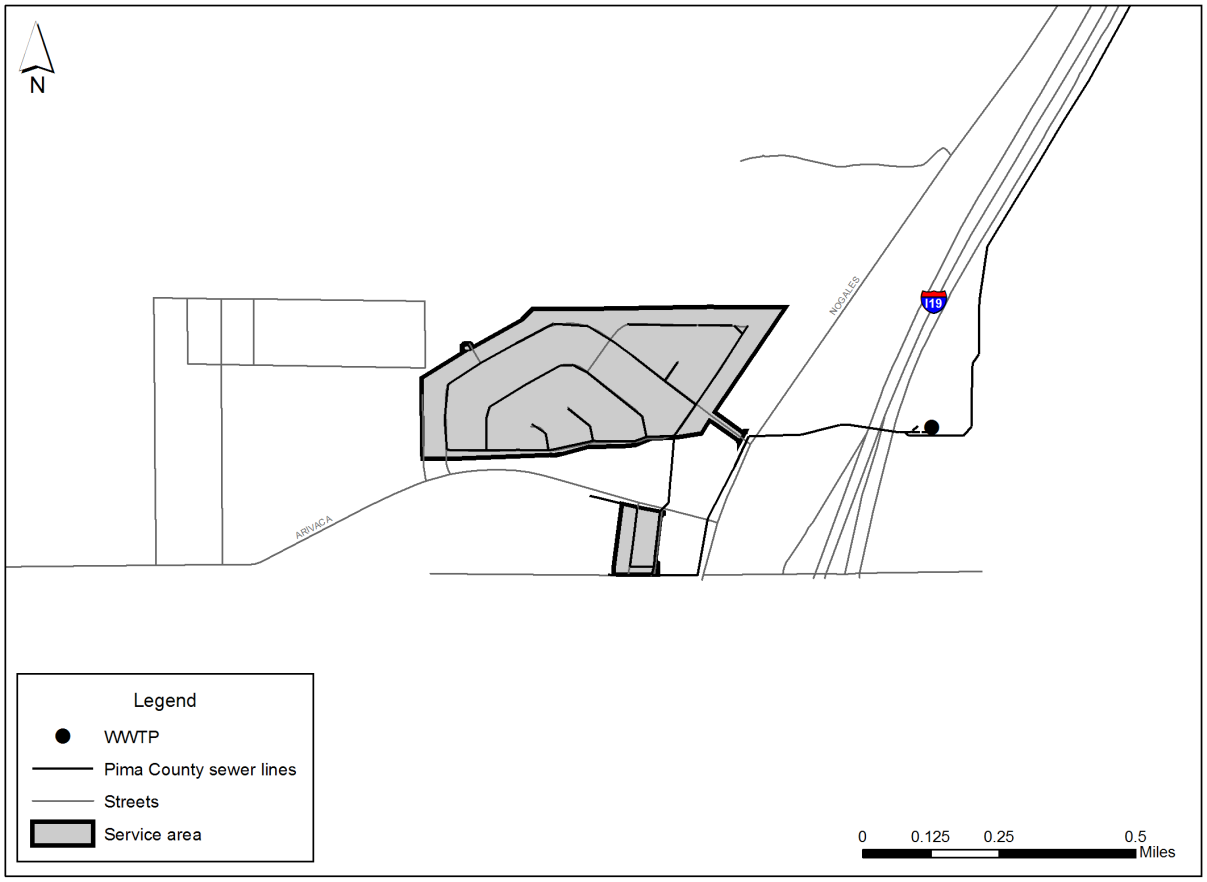
5.4.6.6. Capacity

The permitted treatment capacity of the Arivaca Junction facility is 0.10 MGD (Pima County WWM, 2005a).

5.4.6.7. Current flows

Average daily flows in FY 2003-04 were 0.06132 MGD.

Figure 5-12. Arivaca Junction WWTF Current (2002) Service Area



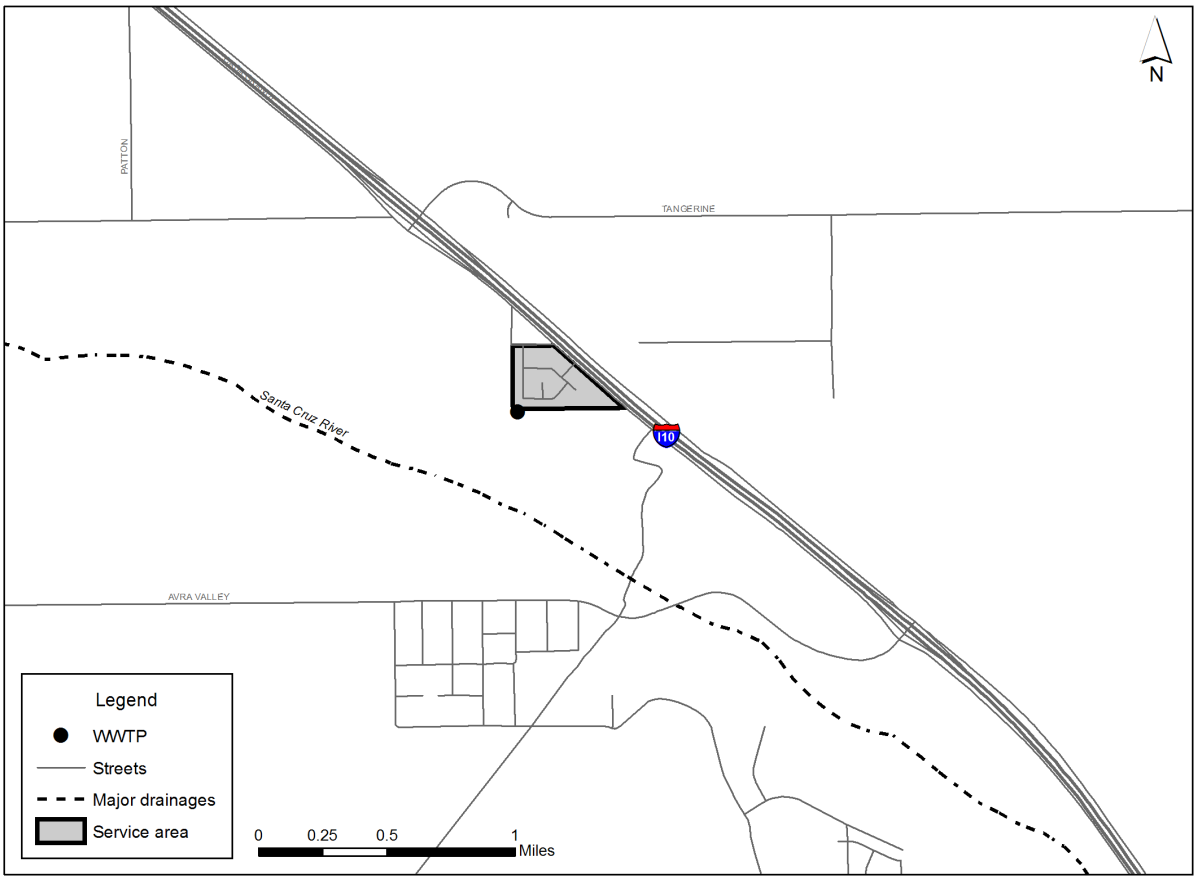
5.4.7. Rillito Vista Wastewater Treatment Facility

Pima County's Rillito Vista WWTF is located northwest of Tucson, between Avra Valley Road and Tangerine Road, and between Interstate 10 and the Santa Cruz River (Figure 5-13). It serves the Rillito Vista subdivision.

5.4.7.1. Service area boundaries

The service area boundaries correspond to the Rillito Vista subdivision boundaries (Figure 5-13).

Figure 5-13. Rillito Vista WWTF Current (2002) Service Area



5.4.7.2. Service area population

The subdivision has 60 lots. This corresponds to a service-area population of 156 people, based on the average owner-occupied rate (2.59 persons/household) published in the Pima County SDCP Housing Report.

5.4.7.3. Service area land uses

The entire service area is residential.

5.4.7.4. Treatment method

The facility consists of two stabilization/evaporation/percolation ponds. Only one pond is used at a time, with the inactive pond dried and scraped before being returned to service.

5.4.7.5. Discharge method and location

Effluent disposal consists of evaporation and percolation.

5.4.7.6. Capacity

The current capacity at Rillito Vista is 0.020 MGD (Pima County WWM, 2005a).

5.4.7.7. Current flows

Current inflows average 0.010 MGD (Pima County WWM, 2005a).

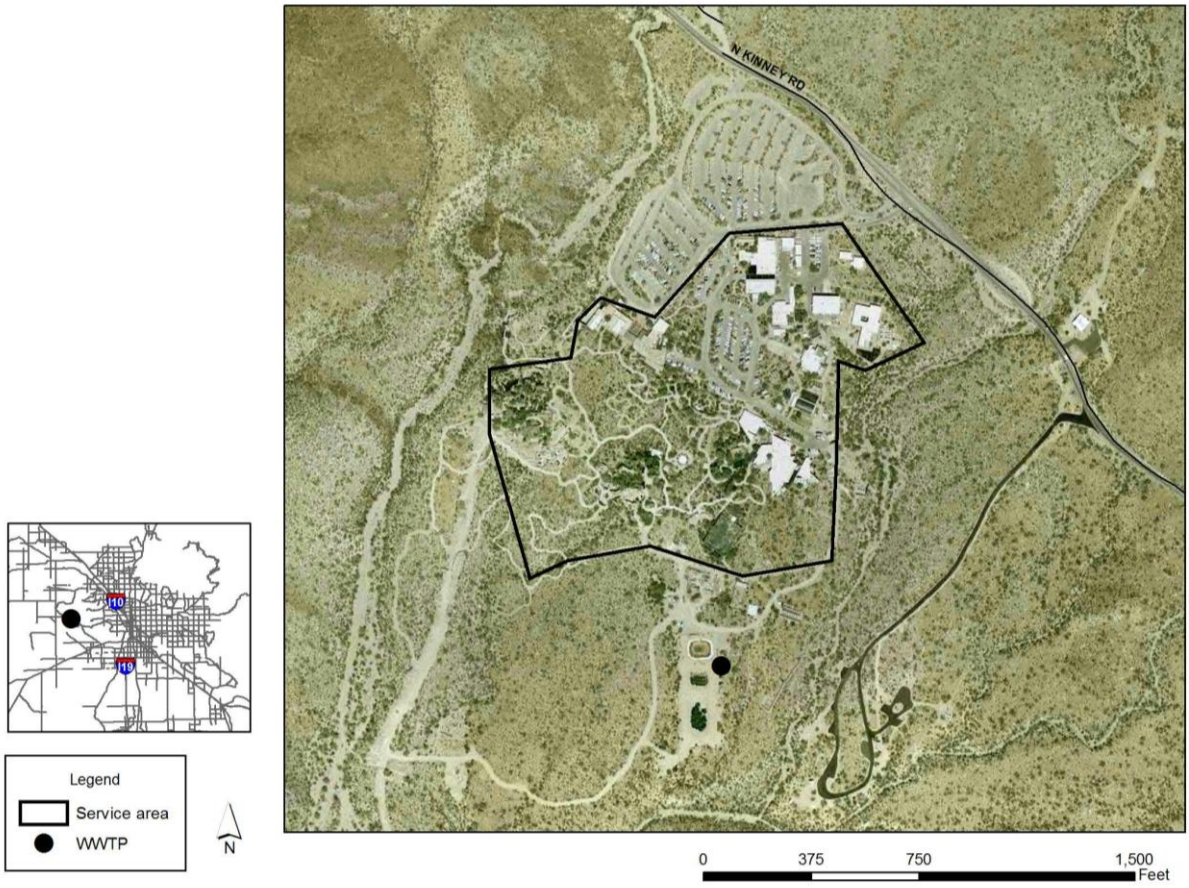
5.4.8. Arizona-Sonora Desert Museum Wastewater Treatment Plant

The Arizona-Sonora Desert Museum (ASDM) has its own wastewater treatment facility in the Tucson Mountains west of Tucson (Figure 5-14). The facility serves ASDM, which is a zoo, natural history museum and botanical garden. ASDM also has a restaurant, a gift shop and several snack shops. The wastewater treatment facility only serves ASDM. It does not serve any off-site properties.

The facility operates pursuant to Aquifer Protection Permit number P100628, which specifies a maximum monthly average domestic wastewater flow of 15,000 gallons per day. The treatment system consists of settling tanks, a flow equalization basin, subsurface leach beds, recirculating sand filter, and disposal trenches. Sludge is hauled off-site for disposal.

The ASDM WWTP was previously operated by Pima County Wastewater Management Department, but has been turned over to the ASDM. The facility APP identifies Pima County Parks and Recreation Department as the land owner of the facility site and Westland Resources Inc. as the operator.

Figure 5-14. Arizona-Sonora Desert Museum WWTF Service Area



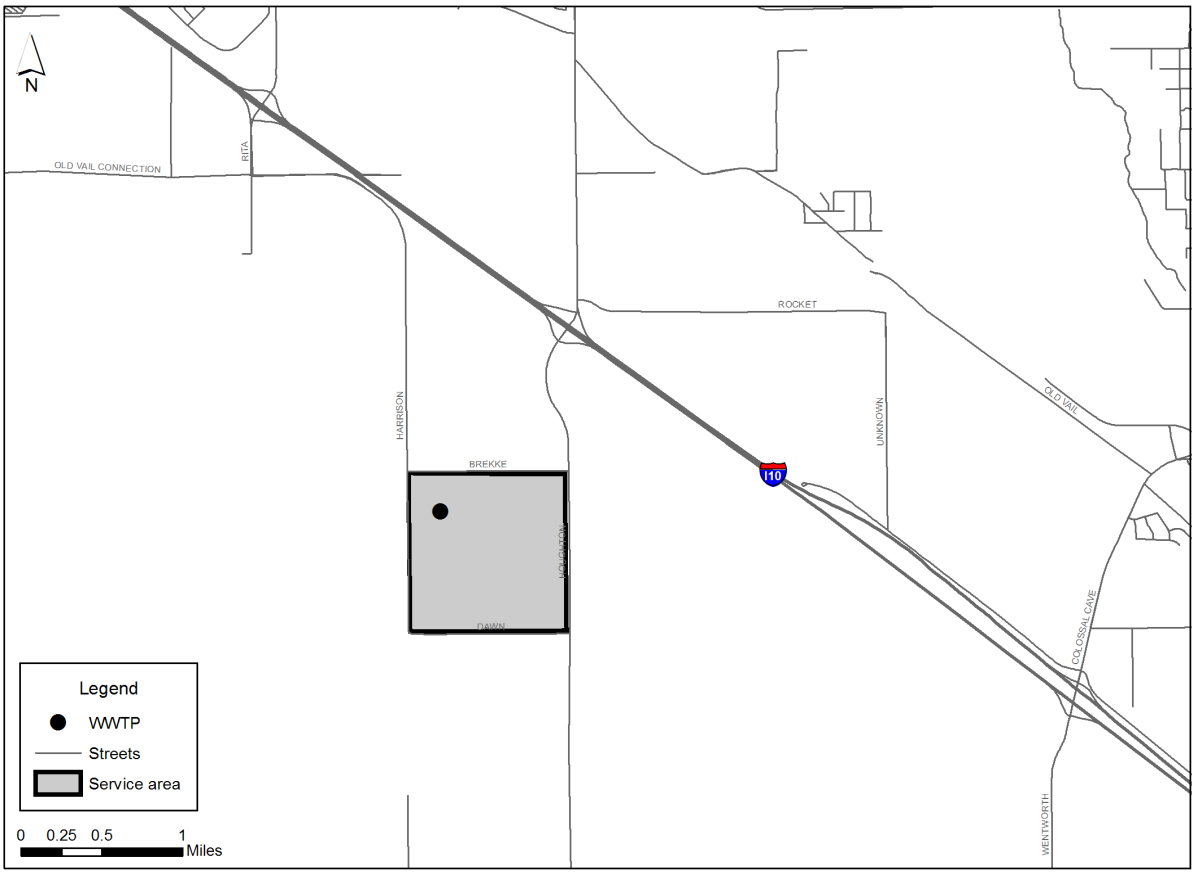
5.4.9. Pima County Fairgrounds Wastewater Treatment Facility

The Pima County Fairgrounds WWTF is located southeast of Tucson at the county fairgrounds south of Interstate 10 and west of Houghton Road (Figure 5-15). The facility only serves the

fairgrounds, and typically only has measurable flow in the month of April when the Pima County Fair is held (Pima County WWM, 2005a). However, the fairgrounds also are used for a variety of public meetings and events (Pima County WWM, 2002).

The facility consists of two primary stabilization ponds and an overflow pond. The facility has a capacity of 0.035 MGD (Pima County WWM, 2005c). It is operated by the Pima County Wastewater Management Department.

Figure 5-15. Pima County Fairgrounds WWTF Current Service Area

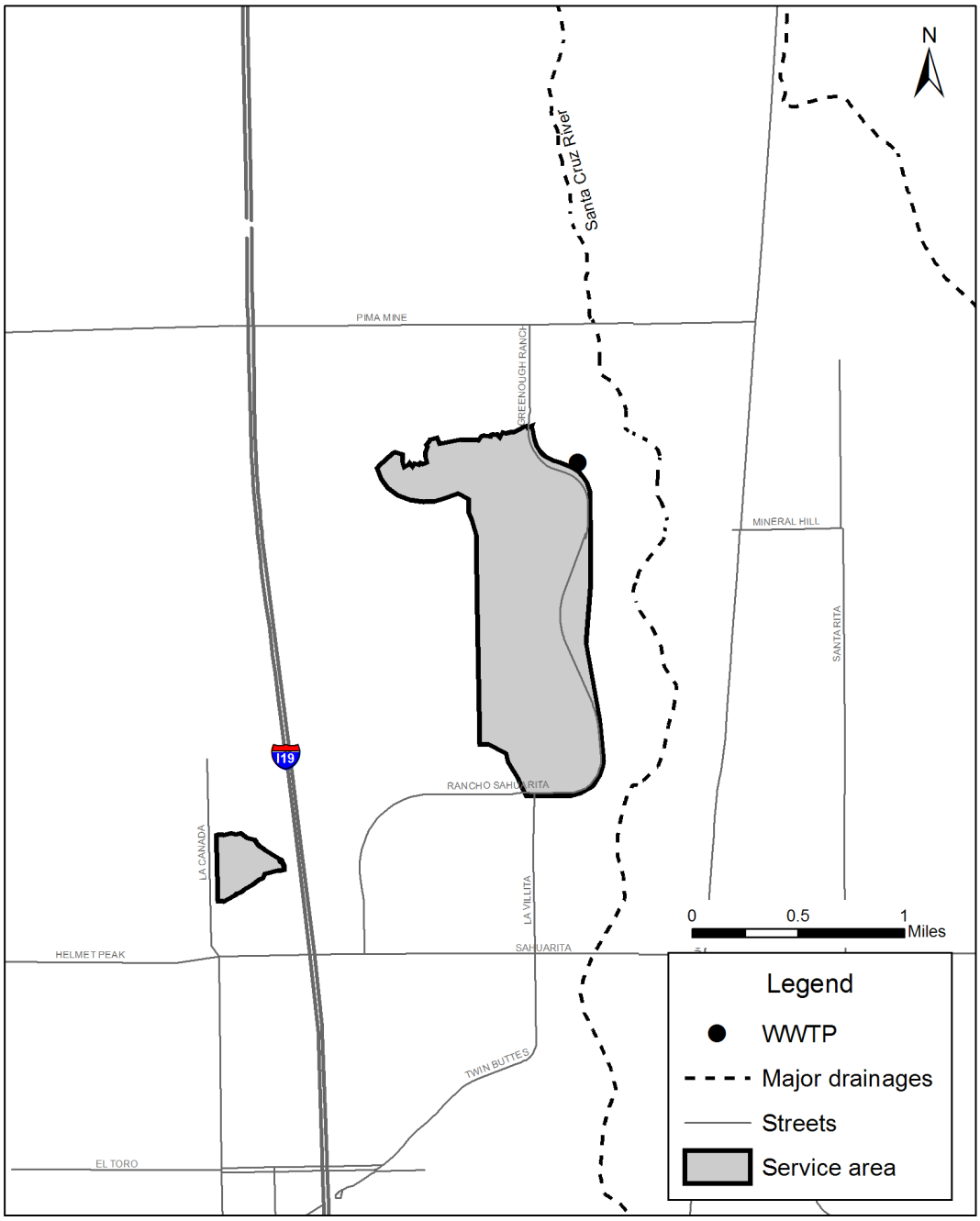


5.4.10. Sahuarita Wastewater Treatment Plant

The Sahuarita Wastewater Treatment Plant was constructed pursuant to a 208 Plan Amendment adopted by the PAG Regional Council in March 1999. It is located west of the Santa Cruz River and south of Pima Mine Road (Figure 5-16). The 208 Plan Amendment outlined a six-phase plan leading to a buildout capacity of 3.0 MGD. Construction of the first two phases was completed by January 2005, with plans for construction of the third phase to begin in 2005 (Town of Sahuarita, 2005).

The 1999 208 Plan Amendment identified the areas to be served by the Sahuarita plant and the areas that would remain under Pima County's service area. See Chapter 4 for more details about the respective Designated Management Areas.

Figure 5-16. Sahuarita WWTP Current (2005) Service Area



5.4.10.1. Service area boundaries

The facility serves the Rancho Sahuarita development, including Rancho Resort.

5.4.10.2. Service area population

The facility has 2,380 service connections.

5.4.10.3. Service area land uses

Land uses in the service area are predominantly residential.

5.4.10.4. Treatment method

Treatment consists of oxidation ditches using a biodenitrification process.

5.4.10.5. Discharge method and location

Effluent is discharged to on-site rapid infiltration basins.

5.4.10.6. Capacity

The permitted capacity is currently 0.25 MGD.

5.4.10.7. Current flows

Current flows are 0.22 MGD.

5.5. NON-PUBLIC WASTEWATER TREATMENT FACILITIES

Non-public wastewater treatment facilities in Pima County include:

- Adonis
- Ajo Improvement Co.
- Arizona State Prison (not consistent with 208 Plan)
- Lukeville
- Marana High School
- Milagro Subdivision
- MTC
- Organ Pipe Cactus National Monument
- Saguaro Ranch Guest Ranch (proposed)
- Sahuarita High School Wetlands
- University of Arizona Science and Technology Park
- U. S. Forest Service – Palisades Ranger Station

These facilities are discussed in Chapter 4.

5.6. OTHER POINT SOURCES

Other point sources in Pima County for which PAG has NPDES permits on file include:

- Twin Buttes Mine
- Davis-Monthan Air Force Base
- O'Malley Companies Groundwater Treatment System
- Tucson Rock and Sand, Inc. (draft permit only on file)

These facilities are described in a separate document (*Water Quality Permits in Pima County*) that PAG prepared in 1999 to compile information on all permitted facilities in the county.

Additional facilities with AZPDES permits in Pima County include (ADEQ, 2005b):

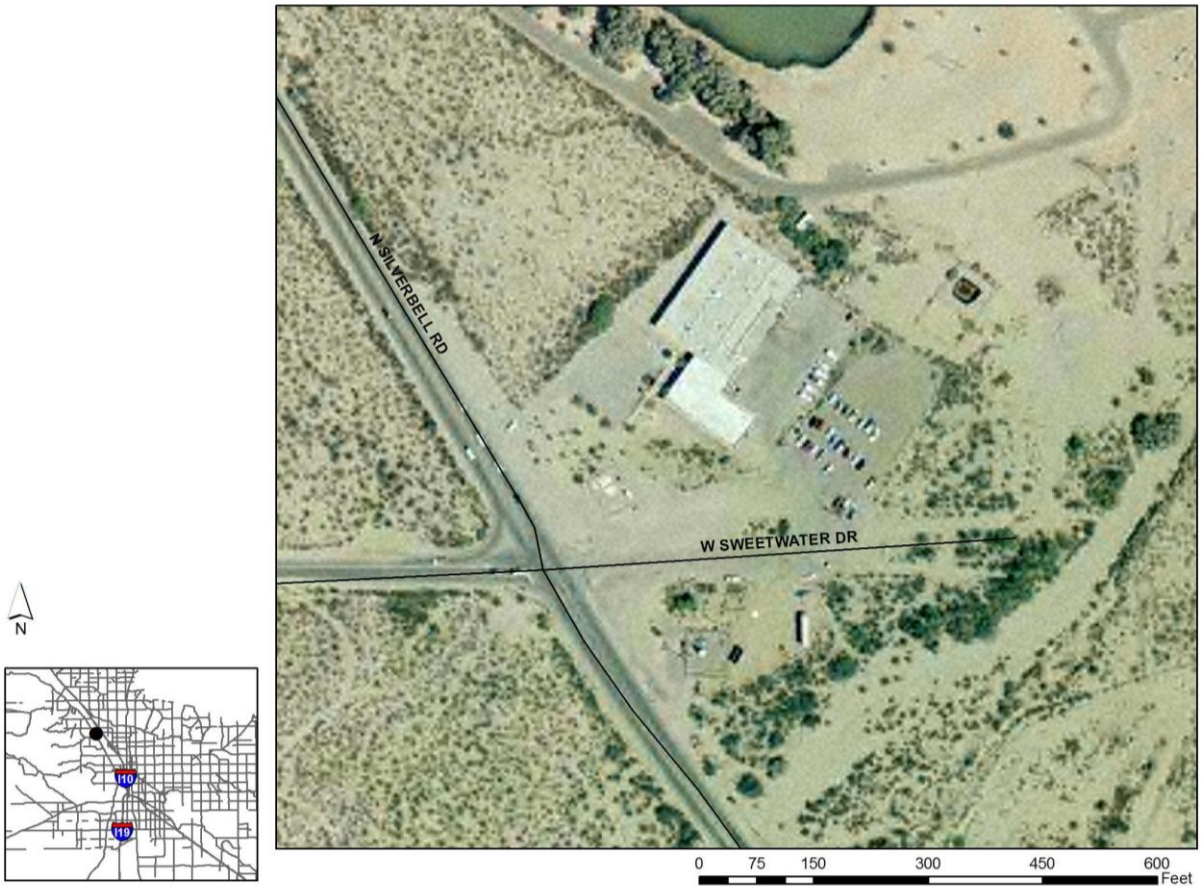
- Tucson Electric - North Loop Generating
- Tucson Fire Station #10

PAG also has a draft NPDES permit on file for the City of Tucson's proposed Atturbury Wash constructed wetlands project, which involves the discharge of reclaimed water to an unnamed

wash tributary to Atturbury Wash. This project has been found to be consistent with the PAG 208 Plan.

One point source identified in the original PAG 208 Plan that is still active is the Pima County Animal Control Center, located at 400 West Silverbell Road, on Tucson's west side (Figure 5-17). The facility includes a 21,000-gallon lined evaporation pond used for disposal of waste tick-dip solutions generated at the facility. The facility is operated in accordance with Aquifer Protection Permit number P-100634. The permit stipulates that there shall be no discharges to the ground surface or to any waters of the United States. Therefore the facility does not have a NPDES permit.

Figure 5-17. Pima County Animal Control Center



A number of wastewater treatment facility point sources identified in the original 1978 PAG 208 Plan no longer exist. These include:

- Arizona Youth Center
- Asthmatic School
- Branding Iron
- Catalina
- Gilbert Ray Campground
- Mountain Gardens
- Puerto Del Norte
- Santo Tomas

Other point sources identified in the original 208 Plan that no longer exist include:

- Arizona Feeds Poultry Farm
- Pacific Fruit Express
- Shamrock Farms

PAG's NPDES permit files include several draft NPDES permits for facilities which have closed or no longer discharge to waters of the United States, or which never received a final permit (PAG, 1999). These include:

- Tucson Electric Power – DeMoss Petri station (permit #AZ0022641)
- "A" Mountain Swimming Facility (permit #AZ0022781)
- Canada Hills Water Company / El Conquistador WWTP (permit #AZ0023370)
- Hughes Aircraft Company (permit #AZ0110264)

5.7. MUNICIPAL STORMWATER NPDES DISCHARGES

Several entities in PAG's region are regulated under the NPDES municipal stormwater permit program. Because Arizona obtained primacy for the NPDES program in 2002, ADEQ now issues NPDES permits (known as "AZPDES" permits) in Arizona. Under this program, entities identified as municipalities in federal regulations must obtain AZPDES permits for stormwater discharged from their areas. The permits include a variety of provisions aimed at protecting the water quality of waterbodies receiving the stormwater discharges. The following entities are regulated by municipal stormwater AZPDES permits:

- City of Tucson
- Pima County
- Town of Oro Valley
- Town of Marana
- City of South Tucson
- Pascua Yaqui Tribe
- Davis-Monthan Air Force Base
- University of Arizona

Issuance of AZPDES permits to these entities for stormwater discharges is consistent with the PAG 208 Plan.

5.8. EXISTING DISCHARGES AND WWTFS THAT ARE NOT CONSISTENT WITH THE 208 PLAN

As discussed in Chapter 4, the Arizona State Prison wastewater treatment facility is not consistent with the PAG 208 Plan. The prison should be served by Pima County Wastewater Management Department, which is the Designated Management Agency for the area.

The Adonis Mobile Home Park owns and operates a sanitary sewerage facility in the vicinity of Grier Road and I-10 in Marana. Although the Adonis facility is briefly mentioned in previous 208 Plan Amendments, it was not included in the original 208 Plan, nor was it the specific focus of any 208 Plan Amendment. The most recent 208 Plan Update for the Marana area (Malcolm Pirnie, 2000) notes that Pima County Wastewater had recommended that wastewater from the Adonis Mobile Home Park be conveyed to the Marana WWTF or to a facility being planned for

the proposed La Mirage Estates subdivision. Removal of the Adonis WWTF and connection of the mobile home park to a public conveyance system would be consistent with the 208 Plan.

5.9. ON-SITE WASTEWATER TREATMENT SYSTEMS

Homes and businesses that are not connected to sewers are served by on-site wastewater treatment facilities. On-site facilities include conventional septic tanks or alternative systems where conditions preclude the use of septic tanks. In Pima County, on-site facilities are used in rural areas where sewer service is not available and lot sizes are one acre or larger. Many areas in Avra Valley, Marana, and semi-rural areas bordering the Tucson metropolitan area rely heavily on septic tanks for wastewater service. Some homes within the metropolitan area also discharge to septic tanks; in most cases these homes were constructed before sewer service was available. It was beyond the scope of this update to identify the locations of existing on-site systems or to plan the locations of future on-site systems. The original 1978 208 Plan identified the non-sewered population in each sewer drainage area and provided pollutant loading estimates. An update of this information could be included in a future update to the 208 Plan.

5.10. WASTEWATER RECLAMATION FACILITIES AND EFFLUENT REUSE SITES

Two facilities in eastern Pima County have been constructed for the sole purpose of wastewater reclamation: the Tucson Reclaimed Water Plant at Roger Road and Pima County's Randolph Park Wastewater Reclamation Facility. The Randolph Park facility is described above. Its location is shown on Figure 5-3.

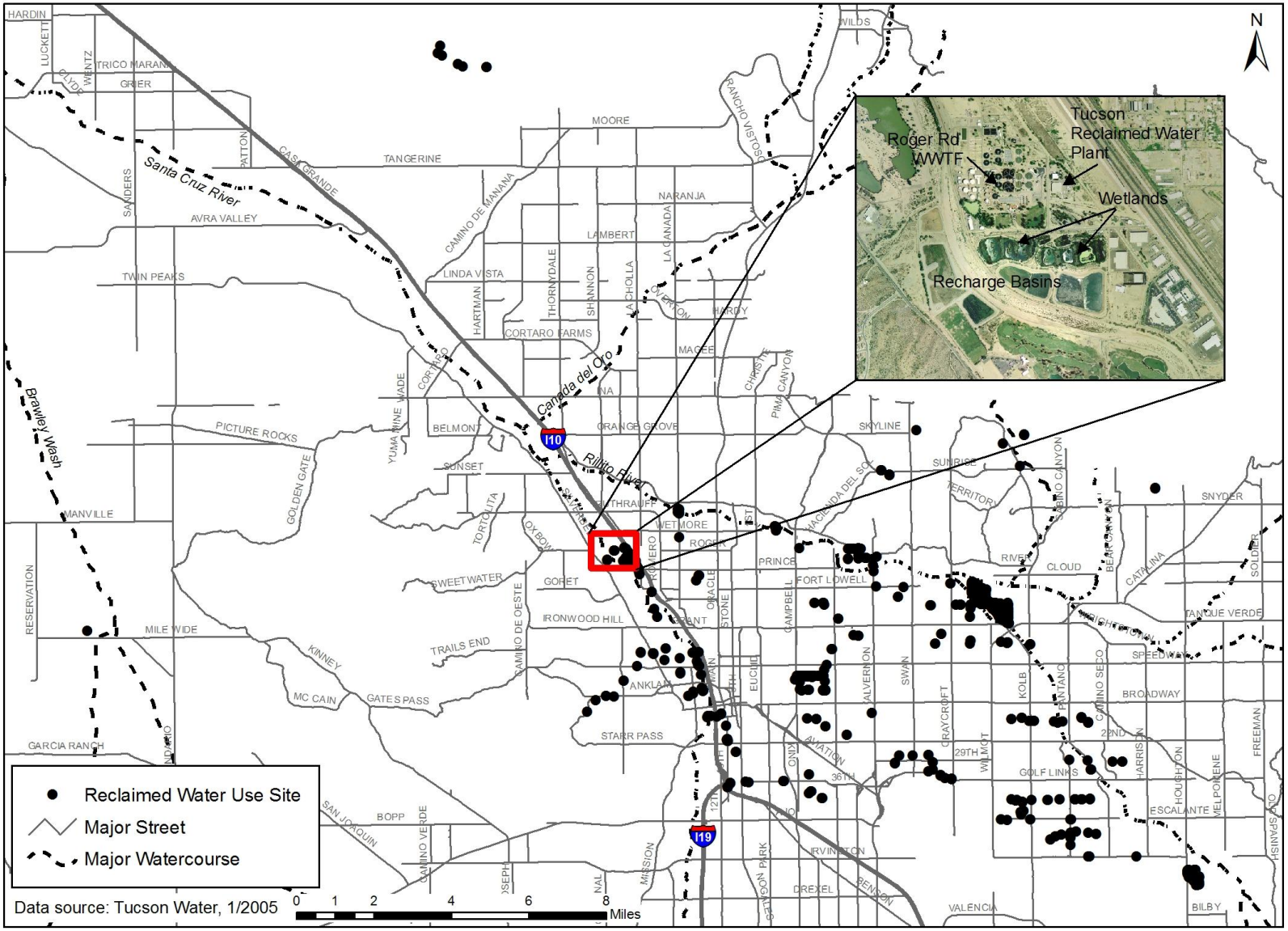
The Tucson Reclaimed Water Plant, which is owned by the City of Tucson, is located next to Pima County's Roger Road Wastewater Treatment Facility, north of Sweetwater Drive between Interstate 10 and the Santa Cruz River (Figure 5-18). The facility receives effluent from the County's Roger Road WWTF and provides additional treatment consisting of pressure filtration and chlorination. The reclamation facility supplies Tucson Water's reclaimed water system, which delivers reclaimed water to locations throughout the metropolitan Tucson area (Figure 5-18). Backwash water from the filtration plant is piped to the Sweetwater Wetlands for natural treatment by the wetlands.

In addition to the Roger Road filtration and chlorination facility and the Sweetwater wetlands, Tucson Water's reclaimed water system includes the Sweetwater Recharge Facilities, where Roger Road WWTF effluent and the treated backwash water from the filtration plant are delivered to a series of recharge basins along the Santa Cruz River. Through soil aquifer treatment, the basins provide additional treatment for the water. Several extraction wells recover the recharged water and return it to the reclaimed water system, where it is chlorinated and delivered to customers.

In addition to the facilities described above, several WWTFs around the county generate effluent that is reused to some extent on-site or at nearby locations in accordance with reuse permits. These are discussed above and in Chapter 3.

PAG policies strongly encourage the reuse of treated wastewater to reduce the reliance on groundwater. Therefore, the facilities described above are consistent with the 208 Plan and are expected to expand as demand for reclaimed water increases in the future.

Figure 5-18. Reclaimed Water Facilities



6. EXISTING SOLID WASTE MANAGEMENT

6.1. REGULATIONS AND DEFINITIONS

The federal Resource Conservation and Recovery Act (RCRA), an amendment of the Solid Waste Disposal Act of 1965, was enacted to address municipal and industrial waste generated nationwide. Nonhazardous solid wastes, household hazardous wastes and hazardous wastes generated by conditionally exempt small quantity generators are regulated under RCRA Subtitle D. RCRA Subtitle D's provisions are designed to protect human health and the environment by ensuring that endangered species, surface water, ground water and floodplains are not threatened by solid wastes. The provisions specify design, operating and closure procedures for municipal landfills, including groundwater monitoring, corrective action and financial responsibility. Additionally, disease vectors, open burning, explosive gas, bird attraction, public access and wastes containing certain types of pollutants are restricted at disposal facilities under RCRA. ADEQ enforces federal and state solid waste regulations through facility plan approvals, self-certification, Aquifer Protection Permits, notice of intent forms, and/or best management practices. In addition, local solid waste codes are in effect.

According to the U.S. Environmental Protection Agency, "solid waste" includes:

- garbage and refuse;
- sludge from a wastewater treatment plant, water supply treatment plant, or air pollution control facility;
- nonhazardous industrial wastes; and
- other discarded materials, including solid, liquid, semi-solid or contained-gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities (EPA, 2003a).

In general, RCRA Subtitle D covers all wastes not classified as hazardous. Municipal solid wastes are a subset of nonhazardous solid wastes, and include "durable goods, nondurable goods, containers and packaging, food wastes, yard trimmings, and miscellaneous organic wastes from residential, commercial and industrial nonprocess sources" (EPA, 2003a).

6.2. DISPOSAL OPTIONS

Solid wastes in Pima County are currently managed via landfills and transfer stations, recycling, land application of biosolids and household hazardous waste disposal programs.

There are also several documented and undocumented wildcat dumps in Pima County (PAG, 1995, 1995a, 1996a). Wildcat dumps are areas where solid waste is illegally disposed, and can contribute to stormwater runoff pollution, wildlife habitat degradation, and disease vector breeding grounds. Pima County Solid Waste Division staff regularly investigate known wildcat dumps, issue citations as appropriate and respond to tips reported to the Illegal Dumping hotline.

6.2.1. Landfills and transfer stations

There are four active municipal solid waste landfills, nine public transfer stations, two construction debris landfills, and nine private solid waste facilities in Pima County. Figure 6-1

shows the locations of the landfills and transfer stations, and Table 6-1 indicates the historical tonnage volumes disposed of at each landfill.

Figure 6-1. Public Landfills and Transfer Stations in Pima County

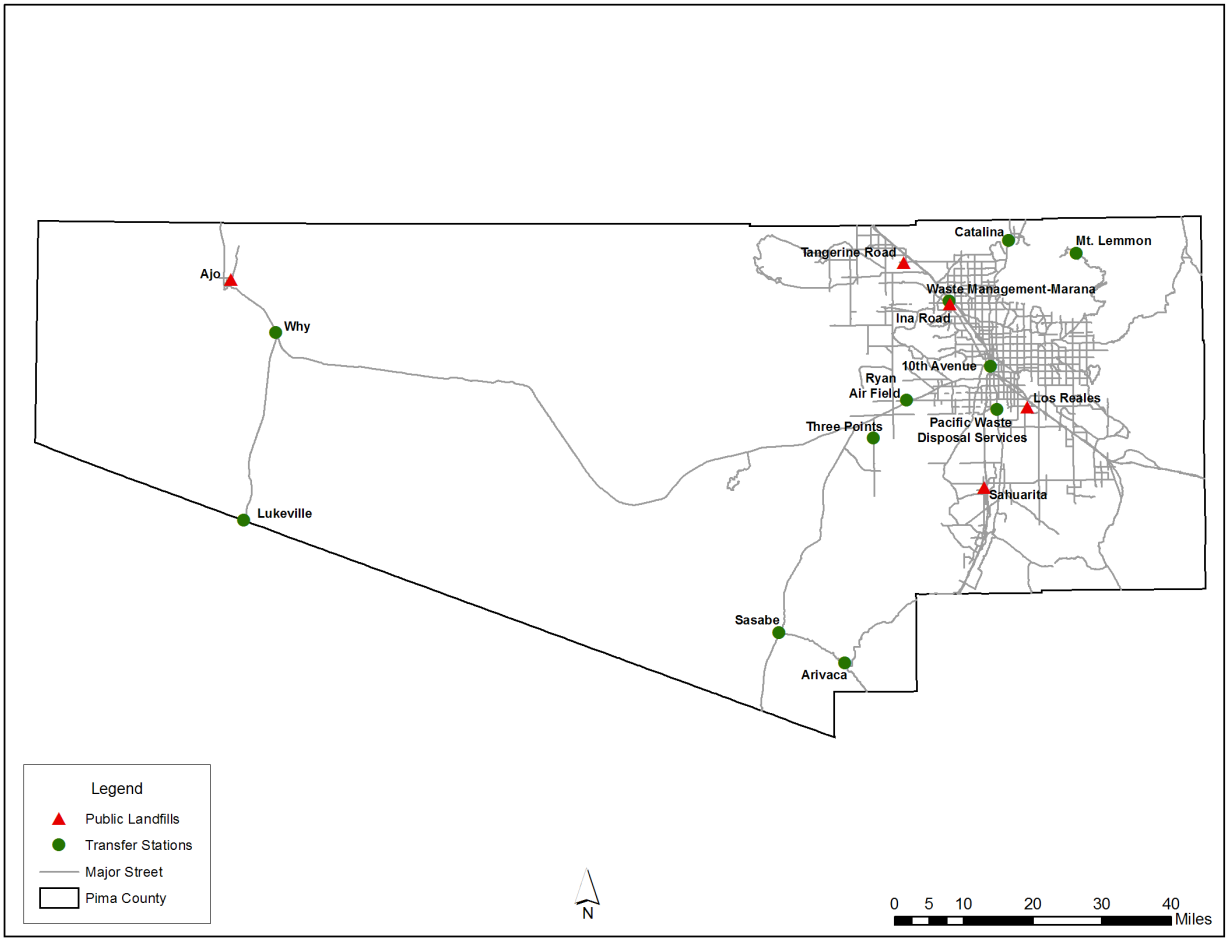


Table 6-1. Disposal Tonnage per Landfill, 1996 – 2002
(ADEQ, 1997, 1998, 1999, 2000, 2001, 2002)

Landfill Name	*1996*	*4/1997-3/1998*	*4/1998-3/1999*	*4/1999-3/2000*	*4/2000-3/2001*	*4/2001-3/2002*
Ajo Municipal	11,864	3,322	3,322	3,322	3,322	2,206
Ina Road Municipal	3,687*	20,072	19,977	31,108	24,658	34,198
Sahuarita Municipal	30,649	29,197	30,505	32,549	42,342	61,922
Tangerine Municipal	171,005	87,216	70,004	78,482	101,736	117,888
Resource Recovery Trust-Speedway	46,160	41,354	51,737	54,821	38,345	24,345
Harrison Road Municipal	228,046	Closed				
Los Reales Municipal	315,918	466,706	427,338	509,990	529,463	515,321
ASARCO Mission				427	854	425
ASARCO Silver Bell				37	121	58
Cyprus Sierrita				797	1,593	360

*ADEQ indicates “inactive”

Three of the four active municipal solid waste landfills (Ajo, Tangerine Road, Sahuarita) are owned and operated by Pima County (ADEQ, 2004d). A small landfill serving the Ajo area, the Ajo landfill is 17.6 acres. Pima County Solid Waste Division estimates it will reach its capacity in another two years, at which time a (most likely vertical) expansion will be needed. Located near Tangerine Road and I-10, the Tangerine Road Landfill also is nearing capacity. Pima County Solid Waste Management Division staff are in the process of vertically expanding the landfill to extend its operational life by one and a half years to mid 2007. It is currently 52 acres. The Sahuarita Landfill is located near Helmet Peak Road and La Canada on the west side of the Town of Sahuarita. An expansion permitting process is also in progress for that site. It is currently approximately 20 acres, and the expansion would add another 21 acres, 2.8 million cubic yards, and another 15 years to the site. Pima County municipal solid waste landfills accept wastes from private refuse hauling companies and residential self-haulers.

The other municipal solid waste landfill in Pima County is owned and operated by the City of Tucson (ADEQ, 2004d). Operated by its Environmental Services Department, the Los Reales Landfill is the largest landfill in Pima County. It is currently 220 acres and 110 feet above grade in places, with a planned expansion to 430 acres. The proposed expansion should extend the capacity of the landfill 60 years (Mikolaitis, 2005) from its current fill date of 2016 (City of Tucson Environmental Services, 2002). Los Reales accepts waste from the City of Tucson residential and commercial refuse trucks, private refuse hauling companies and residential self-haulers.

There are three private, industrial landfills in Pima County. Two are owned by ASARCO Inc., and are located at the Mission Road and Silverbell mines. The other one is owned and

operated by Cyprus-Sierrita Corp. for its mining operations. Both hold mining wastes and do not accept wastes from outside parties.

Pima County's Ina Road Landfill and the private Resource Recovery Trust-Speedway landfill in Tucson are construction debris landfills for commercial haulers only. A former municipal solid waste landfill, the Ina Road landfill is located near Ina Road and I-10. As a result of nearing capacity elevations, expansion plans will have to be drafted in the near future. It is currently 75 acres.

Both Pima County and the City of Tucson operate transfer stations. Pima County owns and operates eight transfer stations throughout the county, and the City of Tucson operates one. Refer to Figure 6-1 for locations. Roll-off bins are provided in Three Points, Why, Lukeville, Mt. Lemmon, Sasabe and Arivaca, and are periodically hauled to the county landfills. Permanent transfer station sites are in Catalina and Ryan Air Field. They accept bagged household trash, green waste, and wood from self-haulers and private trash companies. According to ADEQ records (ADEQ, 2005a) there are two private transfer stations in Pima County. Waste Management Inc. owns a transfer station on Ina Road, west of the I-10 interchange. Located southwest of the Tucson Airport, Pacific Waste Disposal Services also operates a private transfer station.

6.2.2. Biosolids

Biosolids are the solid components of treated raw sewage. Sewage from Pima County Wastewater customers in metropolitan Tucson and private septage haulers is treated for volatile solids and pathogens at the Ina Road Water Pollution Control Facility (WPCF) and the Roger Road Wastewater Treatment Plant. From there, biosolids are transported to the Regional Biosolids Management Facility (RBMF) located near the Ina Road WPCF. At the RBMF, biosolids are further thickened. They are then transported to area farms for land application. Table 6-2 indicates the biosolids volume applied to area farms over the last four years, and the number of participating farms. In 2004, all of the participating farms were located in the Marana area (Pima County WWM, 2005). Agricultural lands in the Marana area have been receiving biosolids since 1983 (McGinley, 2002).

Table 6-2. Historical Volumes of Land Applied Biosolids
(Pima County WWM, 2002a, 2003, 2004, 2005)

Year	*Sites (number)*	*Volume (dry tons)*
2001	27	8,721.80
2002	38	8,188.78
2003	36	7,567.4
2004	24	8,455.65

There are several state and federal regulations covering land application of biosolids to protect human health and the environment. Public access to fields where biosolids are applied is restricted. Lag times between application and harvest are called for, and biosolids must be prevented from entering waterways. Land-applied biosolids must meet vector attraction, pathogen, metals and nitrate standards. State rules (R18-9-1005) also limit cumulative pollutant loading rates for metals and the types of crops that can be harvested where biosolids are applied.

Pima County is researching the feasibility of applying biosolids from the Green Valley Wastewater Treatment Plant to Asarco's Mission Mine tailings as part of a revegetation effort

(Pima County, 2004a). Developing a method to produce higher quality biosolids from lower quality biosolids and evaluating the potential health and environmental effects from revegetating mine tailings with biosolids constitute the core of the research.

Small public and private wastewater treatment plants employ many biosolids disposal options. Transport to the regional Pima County wastewater treatment plants (Roger Road and Ina Road), land applied at the treatment facility, dried in drying beds or landfilled constitute the most common disposal options (Pima County WWM, 2003).

6.2.2.1 Septage

Pima County Ordinance 13.20.060 requires septage haulers to transfer all loads to the Roger Road Septage Receiving Facility at the Roger Road Wastewater Treatment Plant, acquire a discharge permit and pay a disposal fee. At the receiving facility, the septage is degritted and equalized and then introduced to the influent of the Roger Road WWTP. In 2001, nearly 2.7 million gallons were transferred to the RBMP, and 1.6 million gallons were transferred in 2002 (Pima County WWM, 2002a; Pima County WWM, 2003).

6.2.3. Recycling

Recycling solid wastes as an alternative to landfilling is encouraged in many communities. Pima County and the City of Tucson provide extensive recycling programs for common recyclable materials like aluminum cans, newspapers, plastics, glass, paper and cardboard. Services include weekly, curbside pick-ups of commingled, unsorted materials for residential and commercial customers. In addition, neighborhood recycling center drop-off bins are located throughout metropolitan Tucson. Approved recyclables also can be dropped off at Davis-Monthan Air Force Base, Los Reales Landfill, Catalina Transfer Station, Sahuarita Landfill and Tangerine Landfill. The neighborhood recycling centers and other sites recycle the same materials as the weekly pick-ups.

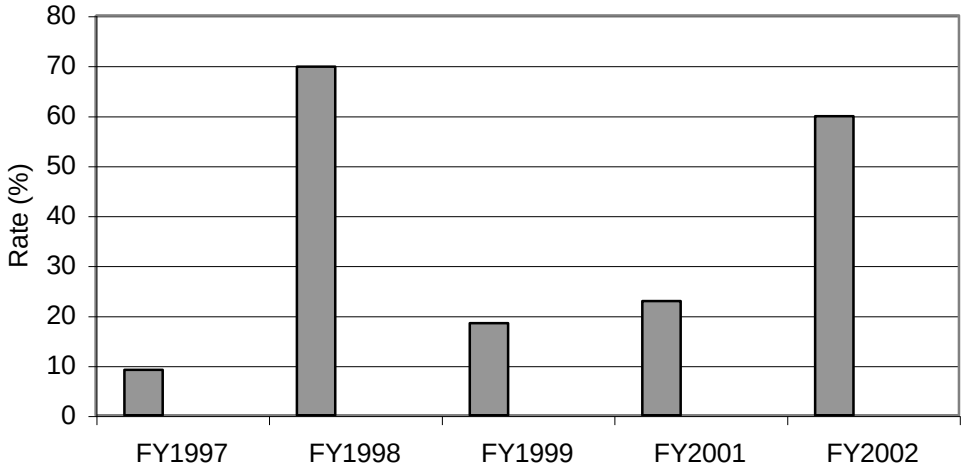
In addition, metal appliances, scrap metal, passenger car and truck tires, and computers and peripherals can be dropped off at the Los Reales Landfill, Catalina Transfer Station, Sahuarita Landfill, and Tangerine Landfill for recycling. Both jurisdictions, through contracted intermediaries, sell the materials as raw materials to manufacturers making new products. Table 6-3 indicates the volumes and types of materials collected in Pima County.

Table 6-3. Recycled Material Weights (tons) in Pima County (ADEQ, 1997, 2000, 2002)

Material	*FY1997*	*FY2000*	*FY2002*
Newspaper	9781.7	8814	25154.29
Cardboard	1701.6	2123	10061.2
Office paper	1579.6	205	1864.99
Aluminum	208.6	337	210
Steel	542	2157	1041.68
PET	381.1	455	418
HDPE	453.2	488	530
Glass	1632.1	3516	5442.8

Figure 6-2 indicates the combined diversion rates over time in Pima County.

Figure 6-2. Combined diversion rates (ADEQ, 1997, 1998, 1999, 2001, 2002)



6.2.4. Household hazardous wastes

The highly successful household hazardous wastes program's primary achievement is reducing the hazardous waste stream entering local landfills. The free service is available to residents and Conditionally Exempt Small Quantity Generators of hazardous wastes. Some of the more common household hazardous wastes are collected at the Los Reales landfill, Sahuarita landfill, Tangerine landfill, and Catalina transfer station. These include antifreeze, batteries, oil and paint. Waste tires are currently collected at the Pima County Ina Road Landfill. Table 6-4 indicates historical waste streams and volumes.

Table 6-4. Household Hazardous Waste Program Historical Waste Streams (pounds)
(Tucson/Pima County HHWP, 1997, 1999, 2000, 2001, 2002, 2003, 2004)

Waste Stream	*7/1994-6/1995*	*7/1995-6/1996*	*7/1996-6/1997*	*7/1997-6/1998*	*7/1998-6/1999*	*7/1999-6/2000*	*7/2000-6/2001*	*7/2001-6/2002*	*7/2002-6/2003*	*7/2003-6/2004*
Used Oil	125,619	167,926	175,215	327,723	398,312	428,250	476,200	436,180	532,576	555,720
Latex Paint	22,550	50,550	57,200	87,250	112,600	114,450	123,600	135,450	157,100	190,550
Paint Sludge	65,705	48,405	52,209	88,592	80,352	88,646	99,072	94,781	90,434	99,156
Auto Battery	22,045	41,743	45,160	64,125	107,075	136,495	177,005	152,435	198,200	222,255
Metal/Cardboard	0	34,150	36,710	51,010	60,361	62,540	67,006	61,650	68,073	66,708
Flammable Liquid	21,370	30,351	29,337	34,147	40,621	39,332	27,590	22,115	20,280	22,576
Antifreeze	22,680	23,620	27,019	35,344	40,136	35,640	31,998	31,570	32,880	45,480
Soap & Wax	6,809	6,054	6,566	9,512	8,563	9,116	9,369	10,914	13,417	14,423
Dry Battery	8,343	5,500	10,778	12,213	12,354	8,020	19,261	14,789	13,893	3,037
Acid	3,366	3,004	1,521	4,981	5,146	3,474	7,069	6,028	6,446	8,646
Pesticide	12,306	2,533	2,625	3,312	4,209	4,952	5,984	7,754	8,572	10,279
Base	2,538	1,358	1,332	2,559	3,947	5,235	5,219	3,026	2,293	6,607
Fluorescent Lamp	299	900	882	789	555	518	924	548	1,098	2,623
Oxidizer	398	26	0	77	34	0	349	17	230	416
Other	4402	0	0	16,554	26,734	52,566	63,915	67,131	91,293	120,858
Total	329,506	485,513	522,407	790,081	941,264	1,021,843	1,149,011	1,078,456	1,286,311	1,434,260

Materials are treated, recycled, reused or redistributed when they are still useable. Between 1994 and June 2004, the HHW Program redistributed 460,542 pounds of useable materials to residents.

6.3. EMERGING ISSUES

Waste disposal in border areas and decreasing capacity at landfills are two emerging solid waste disposal issues in Pima County. Found on drug smuggling and illegal immigration routes across the Arizona / Mexico border, personal garbage like toilet paper, clothes and bodily wastes on public and private lands near the border is increasing (Sierra Times, 2003). In addition, decreasing capacity at landfills in eastern Pima County is another emerging issue. Existing landfills are approaching their capacities, especially those owned and operated by Pima County. Both the City of Tucson and Pima County have submitted landfill expansion permit applications to ADEQ.

7. FUTURE CONDITIONS

7.1. LAND USE PLANS AND POPULATION PROJECTIONS

Wastewater management agencies use population and land-use projections to develop their long-range plans for future wastewater treatment and conveyance facilities. General plans, comprehensive plans, and habitat conservation plans specify general guidelines for the spatial distribution of future urban development, which in turn determines where wastewater system improvements and expansions are needed.

7.1.1. Regional population projections

Historically, official county-level Arizona Department of Economic Security (DES) population projections were used as control totals for municipal population planning purposes. In other words, the sum of individual sub-county population projections had to equal the DES county-wide projection. Several local population projection data products were developed using these control totals. For example, the county-level population projections were disaggregated into census tracts, traffic analysis zones[4] (TAZ), jurisdictional boundaries, and municipal planning areas. Local planning officials then calculated annual growth curves. This process worked well as long as the control totals were issued regularly. However, the most recent county-level DES projection was released in 1997, rendering existing control totals out of date. For example, the Town of Sahuarita exceeded its 2025 projected population in 2005.

In 2000, PAG initiated a new process for projecting future populations for use in transportation planning modeling. It is more of a bottom-up approach to estimating future populations, by taking into account local planning data such as comprehensive plans, general plans, specific plans, habitat conservation plans, building permit data, and designated future land uses. It is built on the traffic analysis zone (TAZ) geography, and covers eastern Pima County. Updated and reviewed on a regular basis by PAG's Population Planning Committee, the new TAZ data set represents the most accurate population data for eastern Pima County.

The TAZ projections show that while Pima County's population is expected to continue to increase over the next two decades, it is expected to grow at a decreased pace and in different geographic locations as compared to the last two decades. Between 1980 and 2004, Pima County's population increased 75.2 percent, with the highest growth rate occurring in the suburbs outside the City of Tucson, including Marana, Oro Valley, and Sahuarita. Annexations and immigration contributed to population increases in these towns. Outside of the growth associated with the Town of Sahuarita's incorporation in 1995, the majority of new growth occurred in the northwest area of metropolitan Tucson.

Today, there are approximately 900,000 residents in eastern Pima County, and that number is expected to increase to nearly 1.5 million by 2030. Most of the growth county-wide is projected to occur in eastern Pima County, specifically on Tucson's southeast and northwest sides. Table 7-1 indicates PAG population projections for eastern Pima County (all jurisdictions are included). Figure 7-1 is a map developed by PAG that shows the areas where the most population growth is expected to occur in the region. The map reflects a consensus among

[4] Traffic analysis zones are geographic areas of varying size that are delineated for the purpose of tabulating transportation-related data, such as population. See Figure 7-2 for a TAZ map.

local planners in the region, and it takes into account the individual jurisdictions' land-use plans and areas targeted for conservation.

Table 7-1. Projected Population Growth in Eastern Pima County*

Year	*Population*
2005	916,028
2010	1,023,332
2015	1,141,690
2020	1,259,689
2025	1,378,155
2030	1,496,045

* "Eastern Pima County," for purposes of this table, encompasses the area shown on Figure 7-2. Data source for the projections is the PAG population projections for Traffic Analysis Zones

7.1.2. Local land use and habitat conservation planning

Many of the jurisdictions within Pima County have drafted general or comprehensive plans, which are designed to guide their land use planning. These plans are associated with the Arizona Growing Smarter Act, which attempts to reconcile future land uses with associated costs and benefits.

In addition, Pima County has developed a comprehensive conservation plan for the County called the Sonoran Desert Conservation Plan (SDCP). The Sonoran Desert Conservation Plan, which received the American Planning Association's 2002 Outstanding Planning Award, covers a 59 million-acre portion of the Sonoran Desert ecosystem in Pima County. The county administrator and Board of Supervisors initiated the plan in 1998 in response to conservation needs for several rare species, most significantly the federally listed cactus ferruginous pygmy-owl. The purpose of the plan is to ensure the long-term protection of "the heritage and natural resources of the west in Pima County." The Sonoran Desert Conservation Plan contains six areas of focus: Protection of Critical Habitat, Biological Corridors, and Mountain Parks, Riparian Restoration, Historic and Cultural Preservation, and Ranch Land Conservation. Over 200 reports have been produced, including a mapped conservation reserve design that prioritizes the protection of the region's biodiversity by applying the six areas of focus above. The Plan was adopted by the Pima County Board of Supervisors in 2001.

In addition, Pima County, the City of Tucson, and the Town of Marana are in the process of drafting multi-species habitat conservation plans (HCPs) due to the presence of endangered species in these jurisdictions. These plans are usually drafted to comply with Section 10 of the Endangered Species Act, which requires HCPs as part of the application process for incidental take permits. By identifying areas that are targeted for habitat conservation, HCPs can influence the future path of population growth.

Pima County's HCP is a component of the Sonoran Desert Conservation Plan. The County's draft multi-species conservation plan establishes a conservation lands system (CLS) that identifies the areas necessary for ensuring "the long-term survival of the full spectrum of plants, animals and biological communities that are indigenous to Pima County" (Pima County, 2005). The CLS includes important riparian areas, biological core management areas, scientific research areas and other areas. The plan provides guidelines for conserving high percentages of lands in these areas in their natural states. The County's multi-species conservation plan has been drafted and is currently under public review (as of October 2005).

The City of Tucson General Plan was approved by voters in the November 2001 election, and the City is currently drafting its habitat conservation plan. The general plan outlines generalized land uses within the current city boundaries. The City's HCP is focused on protecting certain species in Avra Valley, the Southlands, and the portion of the Santa Cruz River corridor that runs from Los Reales Road to the Rillito River confluence.

Marana's General Plan contains an Environment Element that includes a policy of protecting areas of significant biological resource value. It includes goals such as the following:

> "Purchase or secure conservation easements for land parcels of high resource that will not otherwise be protected from development."

> "Incorporate biological reserves as part of Marana's overall open space planning efforts."

Figure 7-1. Projected 2030 Population in Eastern Pima County

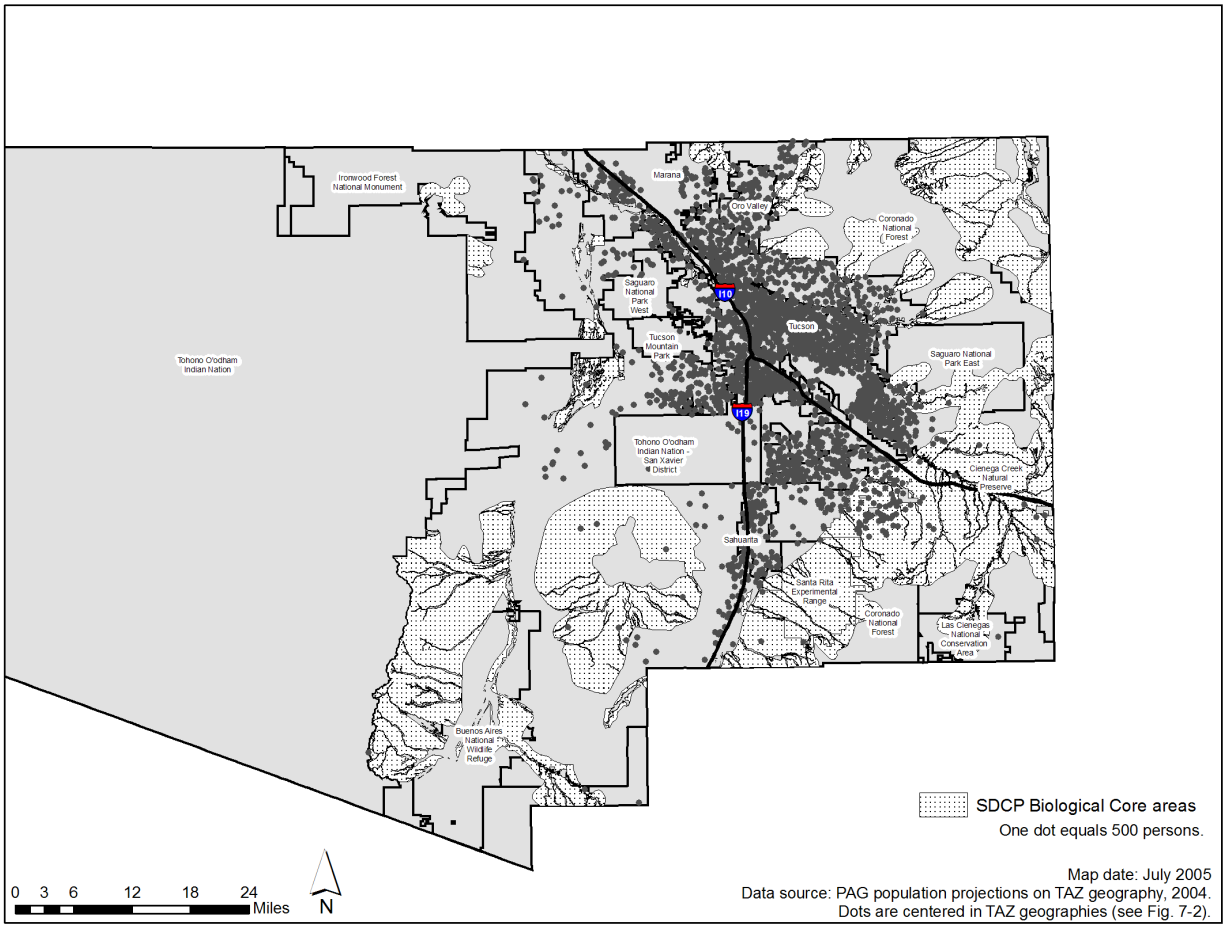
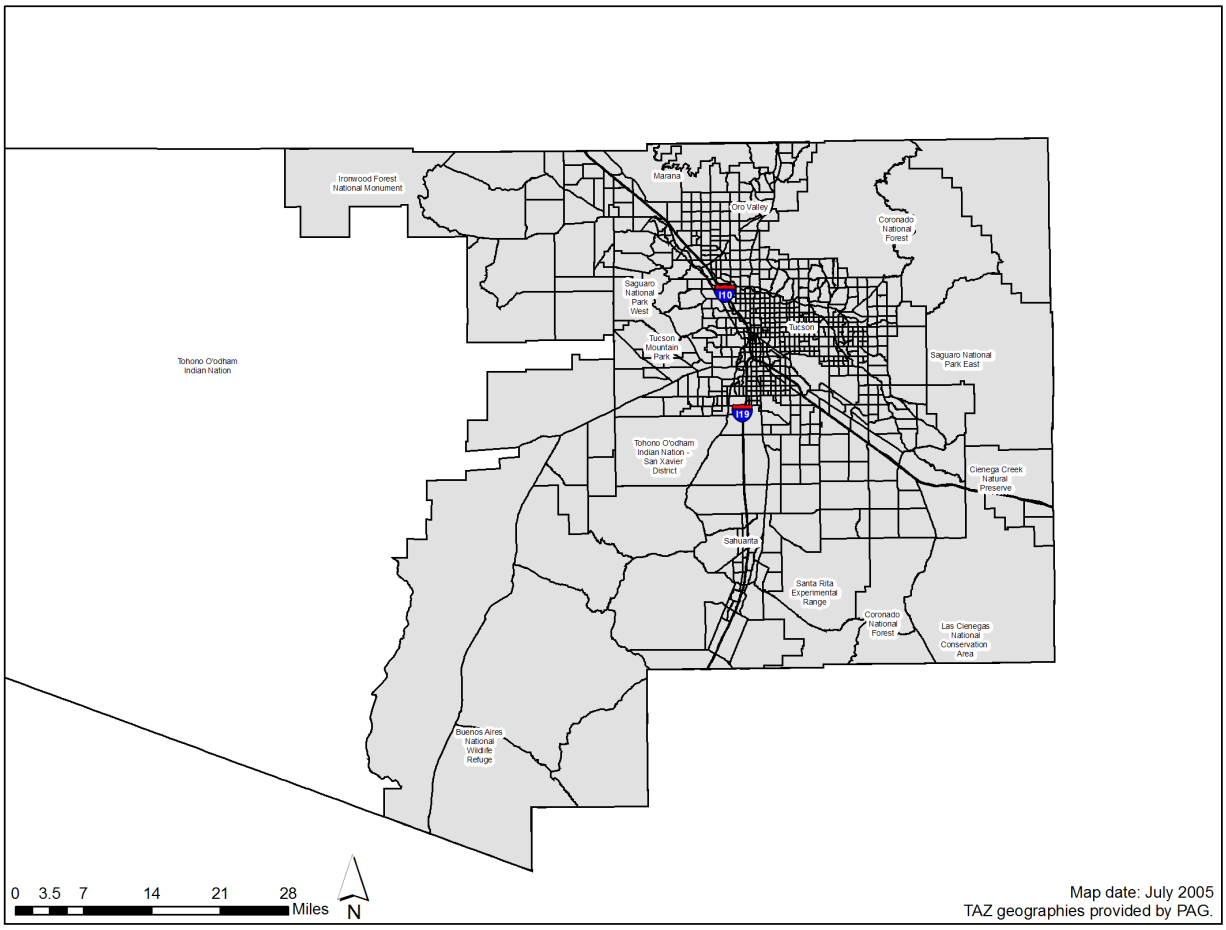


Figure 7-2. Traffic Analysis Zones in Pima County



7.2. POPULATION AND WASTEWATER FLOW PROJECTIONS IN DESIGNATED MANAGEMENT AGENCY (DMA) SEWER SERVICE AREAS

Table 7-2 shows projected service area populations in five-year increments for wastewater treatment facilities operated by Designated Management Agencies. Areas anticipated to possibly be served by the existing DMA wastewater treatment facilities are shown on Figures 7-3 through 7-9.

Table 7-2. Projections of Total Population for Service Areas of DMA Wastewater Treatment Facilities.

Facility	*2010*	*2015*	*2020*	*2025*	*2030*
[1]Roger Rd	563,158	607,065	650,791	694,750	738,416
[1]Ina Rd	269,565	283,032	296,398	309,895	323,233
[1]Avra Valley	26,135	30,659	35,177	39,702	44,218
[1]Corona de Tucson	12,581	17,343	22,101	26,865	31,622
[1]Marana	23,282	31,721	40,151	48,592	57,018
[2]Green Valley*	28,332 – 31,699	32,301 – 36,813	36,257- 41,916	40,230 – 47,036	44,181- 52,129
[2]Sahuarita*	11,326 – 14,974	16,547 – 21,365	21,764 – 27,756	26,982 – 34,145	32,199 – 40,531

* lower number excludes joint planning areas; higher number includes them

[1] Projections provided by Pima County Wastewater Management Department

[2] Projections calculated by PAG

Pima County Wastewater Management Department provided the service-area population projections that were developed in coordination with Tucson Water for the County's Facility Plan update and Tucson Water's *Water Plan: 2000-2050*. These projections include data for the following facilities: Avra Valley, Corona de Tucson, Ina Road, Marana and Roger Road.

These estimates were calculated by overlaying the TAZ population projections on the service areas for each facility. Along the margins of the service areas, where only a portion of a TAZ was included within the service area, the future population projected for the TAZ was assumed to be distributed uniformly across the TAZ. For example, if two-thirds of a TAZ fell within a service area, then two-thirds of the population projected for the TAZ was assigned to the service area. PAG calculated the future estimated population for the Green Valley and Sahuarita service areas using the same methodology. PAG also calculated a high and low population estimate for each facility, with the high estimate representing the population that the facility's service area would include if the potential future service area encompassed all of the joint planning areas (Figure 4-4) and the low estimate representing population that the facility's potential future service area would include if it did not encompass any of the joint planning areas.

The population projections presented above are the best available, and they are the same projections used by Pima County Wastewater in the County's facility plan update, and by Tucson Water in their long-range water resources plan (*Water Plan: 2000-2050*). However, any number of factors could cause actual population growth, either in a given area or region-wide, to be more or less than projected, such as the timing of land sales by the State Land Department, changes in the real estate market, changes in the local economy, and changes in the status of species with regard to the Endangered Species Act.

Using the service area delineations (Figures 7-3 through 7-9) and TAZ-based population projections per service area (Table 7-2), Pima County Wastewater Management Department developed future wastewater flow projections at five-year increments for the Roger Road, Ina Road, Avra Valley, Marana and Corona de Tucson facilities for its Facility Plan Update, and provided these projections for PAG's 208 Plan Update. Pima County Wastewater, working with Tucson Water, projects that the amount of effluent generated per capita will be an overall average of 85 gallons per day. Pima County Wastewater accounted for septic tank usage by subtracting the estimated current population on septic tanks from all future flow estimates. They assumed that the current population served by septic tanks would remain on septics, and that all future population growth would be served by sewers.

PAG calculated future flow projections for the Green Valley WWTF (which was not included in Pima County's facility plan update) and the Sahuarita WWTF. PAG calculated a high and low flow estimate for each facility, with the high estimate representing the flows that the facility would receive if the facility served all of the joint planning areas (Figure 4-4) and the low estimate representing flows that the facility would receive if it did not serve any of the joint planning areas. For both facilities, PAG used the same overall average per capita effluent generation rate used by Pima County and Tucson Water for the other facilities (85 gallons per day). For Green Valley, PAG accounted for septic tanks by using the same method used by Pima County for the facilities included in the Facility Plan Update. PAG then subtracted the current population served by septic systems (as determined in consultation with Pima County) from each of the 5-year estimates, thus assuming that the population served by septic tanks will remain constant. PAG did not correct for septic tank usage in the Sahuarita WWTF flow projections, because no data on septic tank usage were available. PAG assumed that the entire population in the Sahuarita WWTF service area would be served by the WWTF. For both facilities, PAG assumed that populations would be evenly distributed across any TAZ that is crossed by a service area boundary, which is the same assumption that Pima County used in its Facility Plan Update.

Table 7-3 provides projections of the population on sewer service in each WWTF service area. Table 7-4 provides the wastewater flow projections calculated by Pima County Wastewater Management Department and PAG.

Table 7-3. Projections of Sewered Population for Service Areas of DMA Wastewater Treatment Facilities.

Facility	*2010*	*2015*	*2020*	*2025*	*2030*
[1]Roger Rd	*539,661*	*583,568*	*627,294*	*671,253*	*714,919*
[1]Ina Rd	*231,289*	*244,756*	*258,122*	*271,619*	*284,957*
[1]Avra Valley	*16,624*	*21,148*	*25,666*	*30,191*	*34,707*
[1]Corona de Tucson	*11,954*	*16,716*	*21,474*	*26,238*	*30,995*
[1]Marana	*18,458*	*26,897*	*35,327*	*43,768*	*52,194*
[2]Green Valley*	27,113 – 30,367	31,082 – 35,481	35,038 – 40,584	39,011 – 45,704	42,962 – 50,797
[2]Sahuarita*	n/a	n/a	n/a	n/a	n/a

* lower number excludes joint planning areas; higher number includes them

[1] Projections provided by Pima County Wastewater Management Department

[2] Projections calculated by PAG

n/a = sewered population was not estimated because current septic tank data were not available

Table 7-4. Flow Projections for Service Areas of DMA Wastewater Treatment Facilities[3].

Units are million gallons per day (MGD)

Facility	*208 Consistency Factor*	*2010*	*2015*	*2020*	*2025*	*2030*
[1]Combined Roger/Ina**	*20%*	*63*	*68*	*72*	*77*	*82*
[1]Avra Valley	*80%*	*1.41*	*1.8*	*2.18*	*2.57*	*2.95*
[1]Corona de Tucson	*80%*	*1.02*	*1.42*	*1.83*	*2.23*	*2.63*
[1]Marana	*80%*	*1.57*	*2.29*	*3.00*	*3.72*	*4.44*
[2]Green Valley*	*80%*	2.30 – 2.58	2.64 – 3.02	2.98 – 3.45	3.32 – 3.88	3.65 – 4.32
[2]Sahuarita*	*80%*	0.96 – 1.27	1.41 – 1.82	1.85 – 2.36	2.29 – 2.90	2.74 - 3.45

* lower number excludes joint planning areas; higher number includes them

** For purposes of future 208 consistency determinations, any combination of Roger Road and Ina Road WWTF capacities whose total is within the combined projections will be considered consistent with the 208 Plan.

[1] Projections provided by Pima County Wastewater Management Department

[2] Projections calculated by PAG

[3] Note that these are merely flow projections; facility capacity expansions are typically constructed significantly in advance of the flows actually reaching these levels.

Future populations and flows were not calculated for the Arivaca Junction, Rillito Vista, Fairgrounds, Randolph or Mt. Lemmon facility service areas. The Arivaca Junction facility is projected to close, and the flows could be diverted to either the Green Valley plant or a package plant at Canoa Ranch to produce reclaimed water. The Rillito Vista plant is expected to remain the same size and could eventually be incorporated into the Marana facility, although the possibility of a future expansion to relieve the Continental Ranch Pump Station is noted in Pima County's Facility Plan Update. No immediate plans exist to increase the capacity for the Fairgrounds facility, but it may eventually be expanded/improved based on a future evaluation of needs in the area. Flow to the Mt. Lemmon facility is currently limited by an agreement with the United States Forest Service, but the community planning process ongoing since the Aspen Fire will include water and wastewater infrastructure capacity needs and recommendations. Randolph Park is a water reclamation facility that reclaims effluent from flows tributary to Roger Road. Thus its future service area population is included in the projections for Roger Road.

Figure 7-3. Area Included in Service Area Population Projections for the Roger Road WWTF

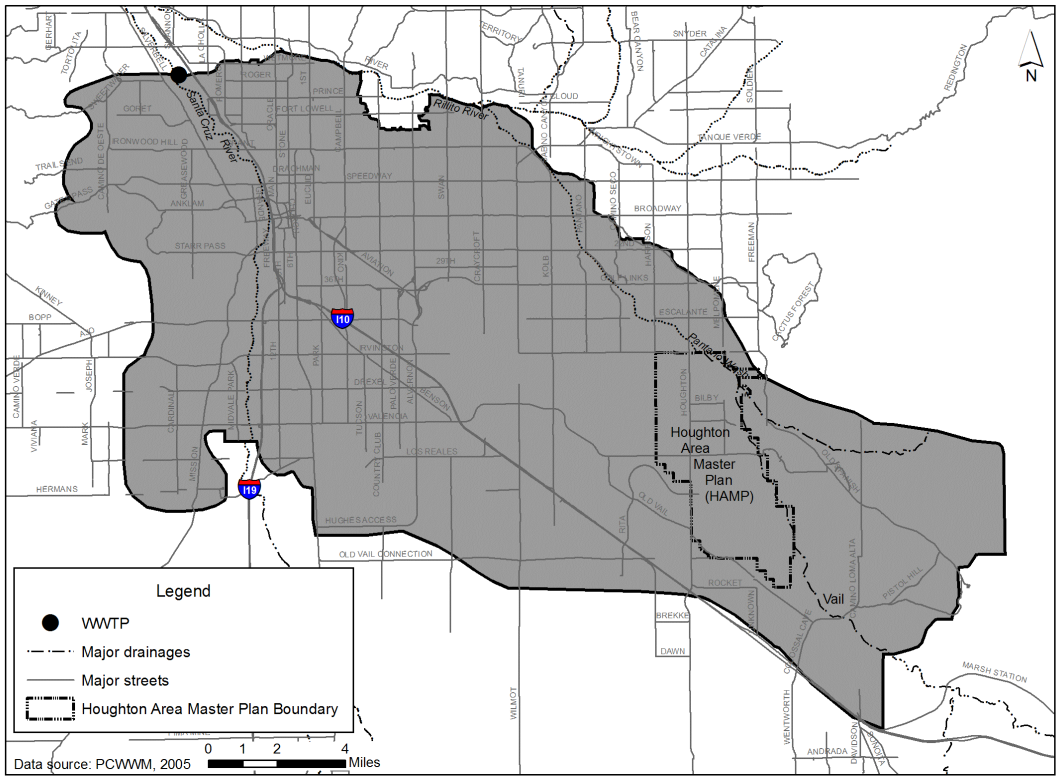


Figure 7-4. Area Included in Service Area Population Projections for the Ina Road Water Pollution Control Facility

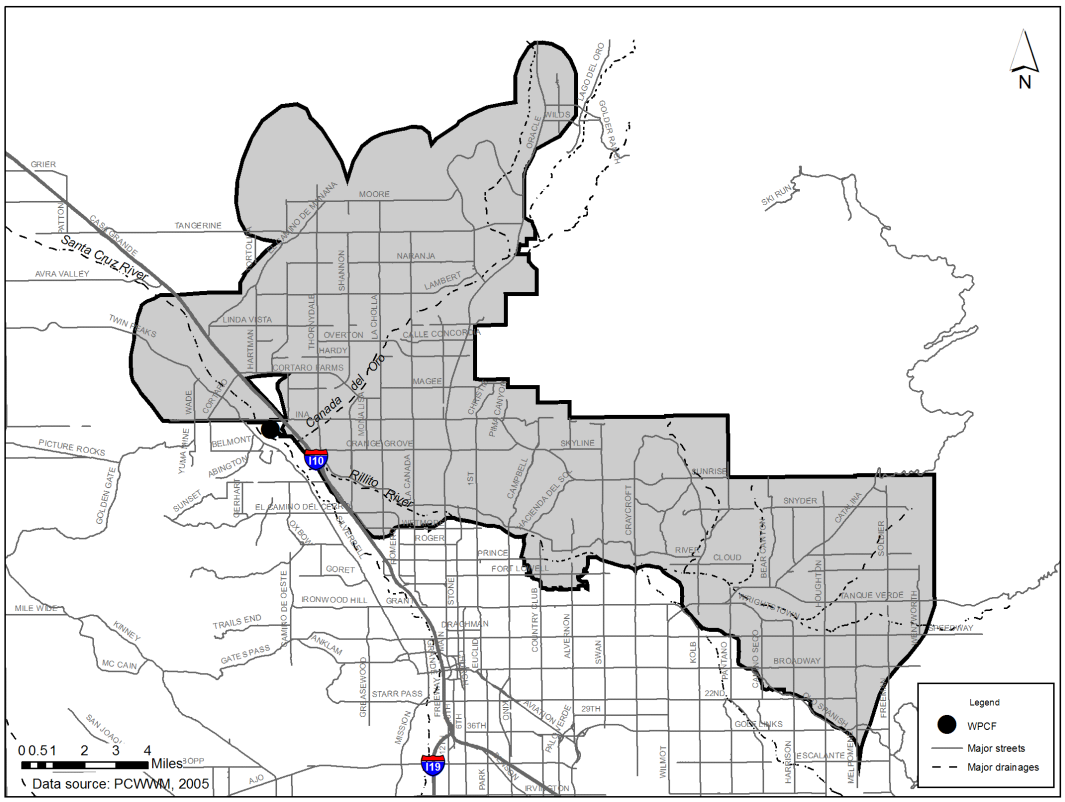


Figure 7-5. Area Included in Service Area Population Projections for the Avra Valley WWTP

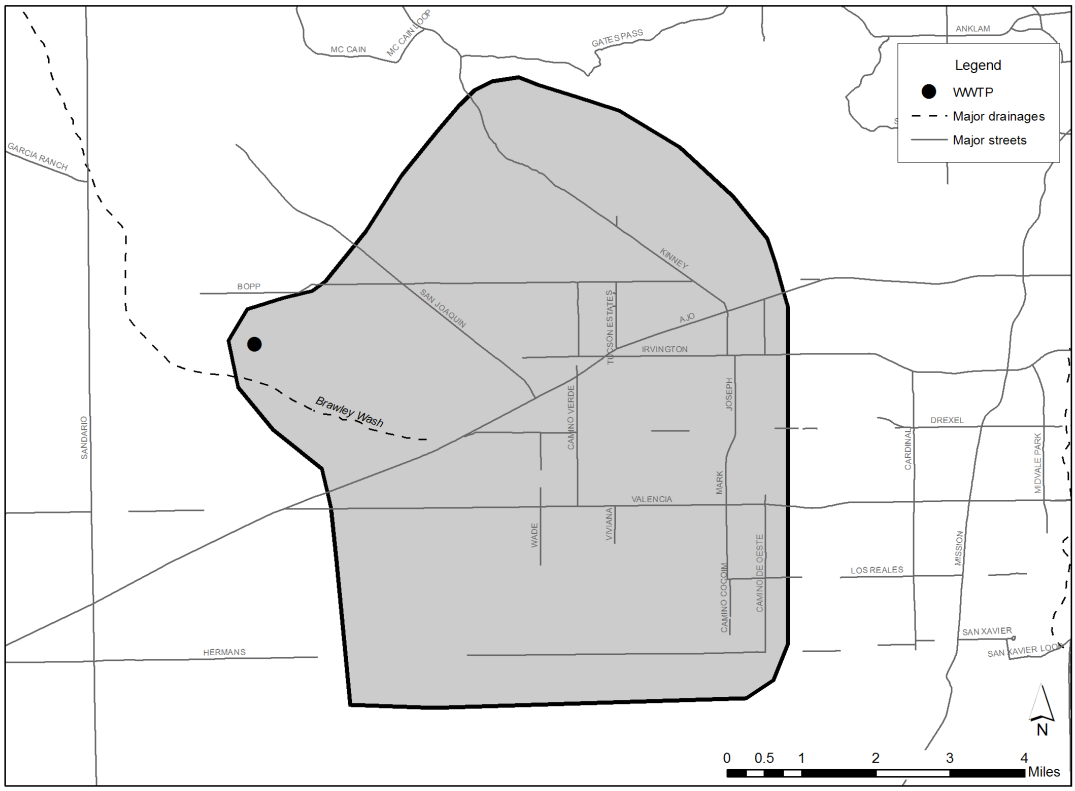


Figure 7-6. Area Included in Service Area Population Projections for the Corona de Tucson WWTF

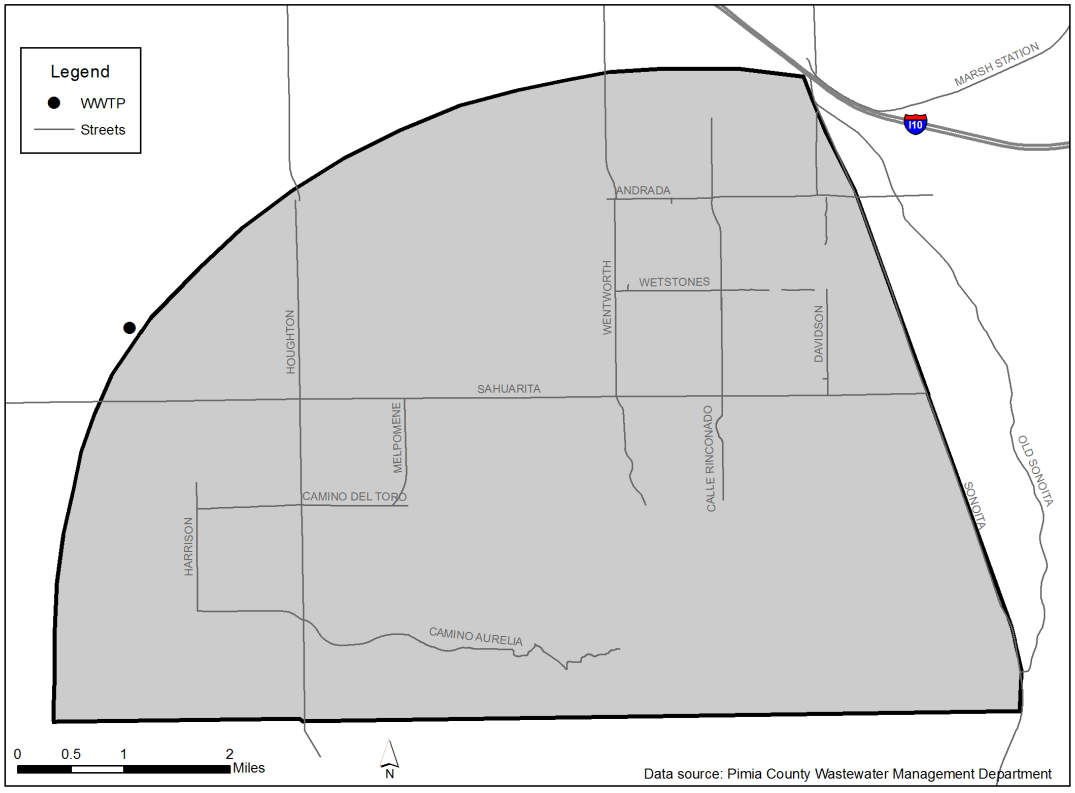


Figure 7-7. Area Included in Service Area Population Projections for Marana WWTP

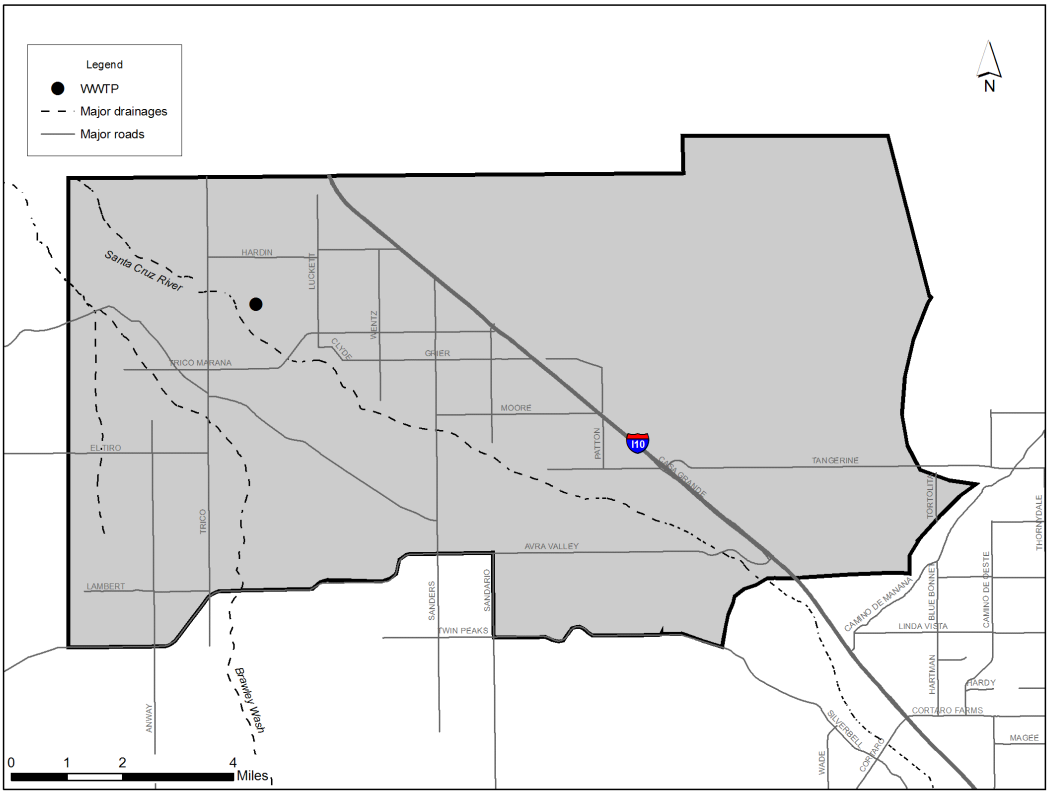


Figure 7-8a. Area Included in Service Area Population Projections for Green Valley WWTP (excludes Joint Planning Areas)

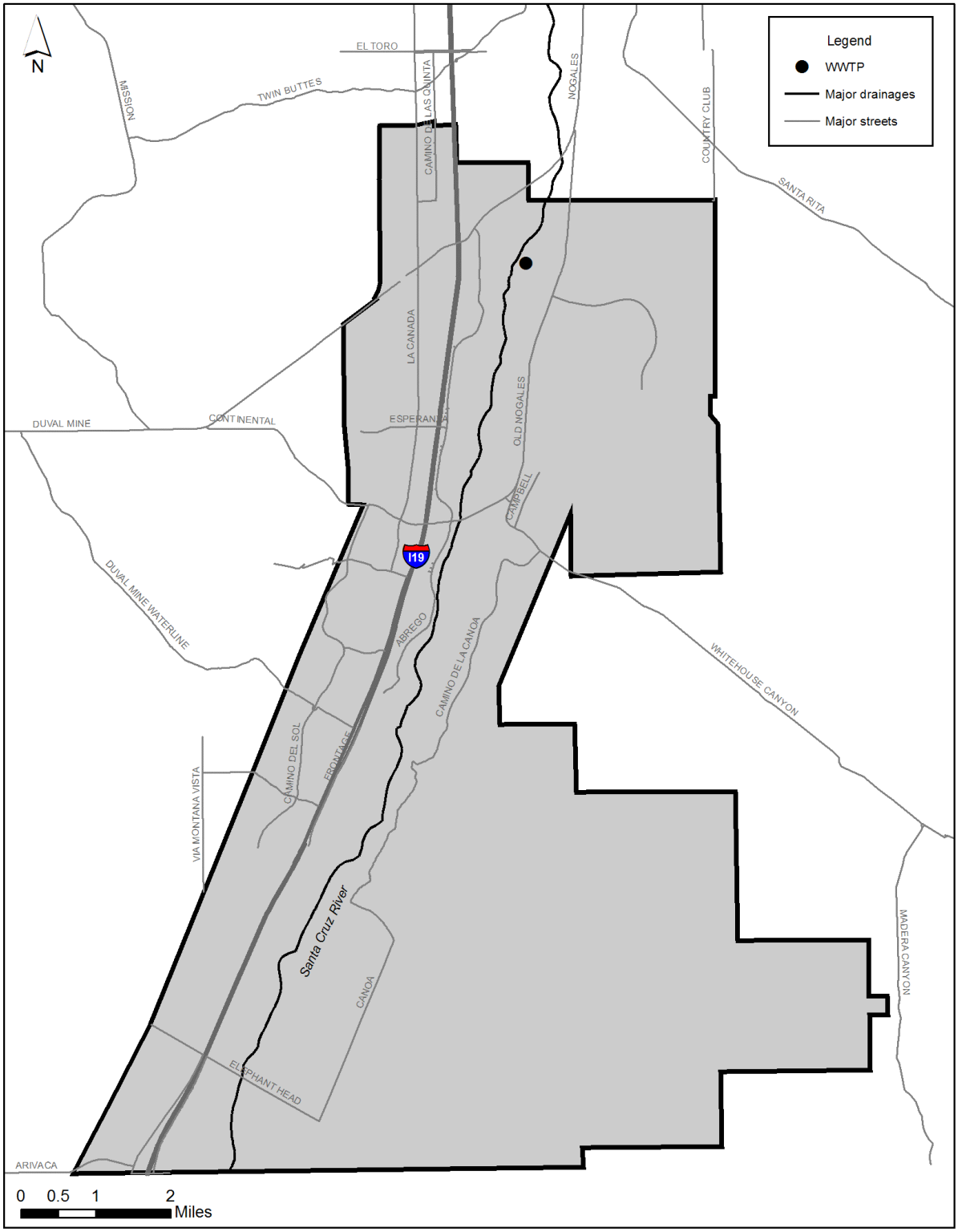


Figure 7-8b. Area Included in Service Area Population Projections for Green Valley WWTP (includes Joint Planning Areas)

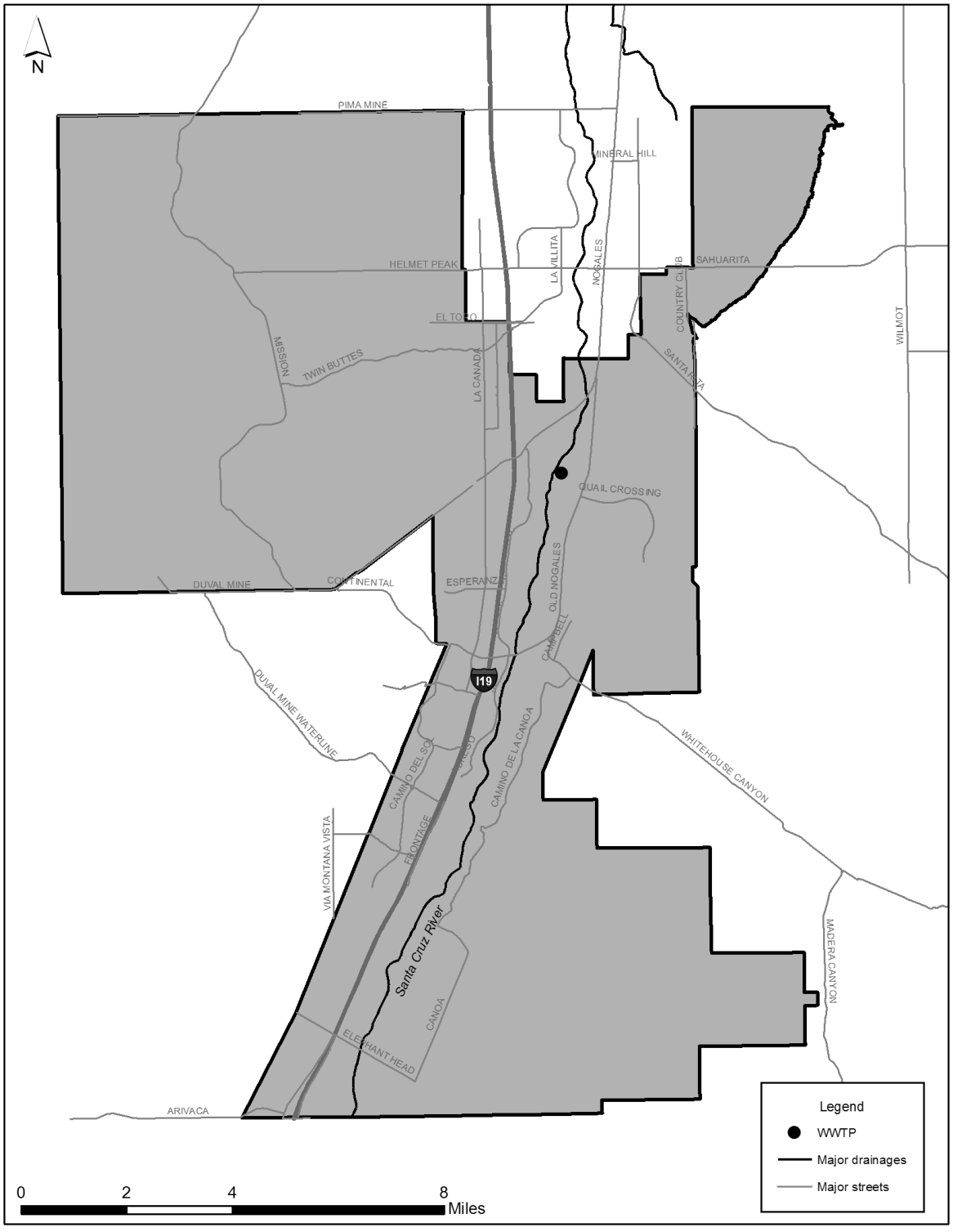


Figure 7-9a. Area Included in Service Area Population Projections for Sahuarita WWTF (excludes Joint Planning Areas)

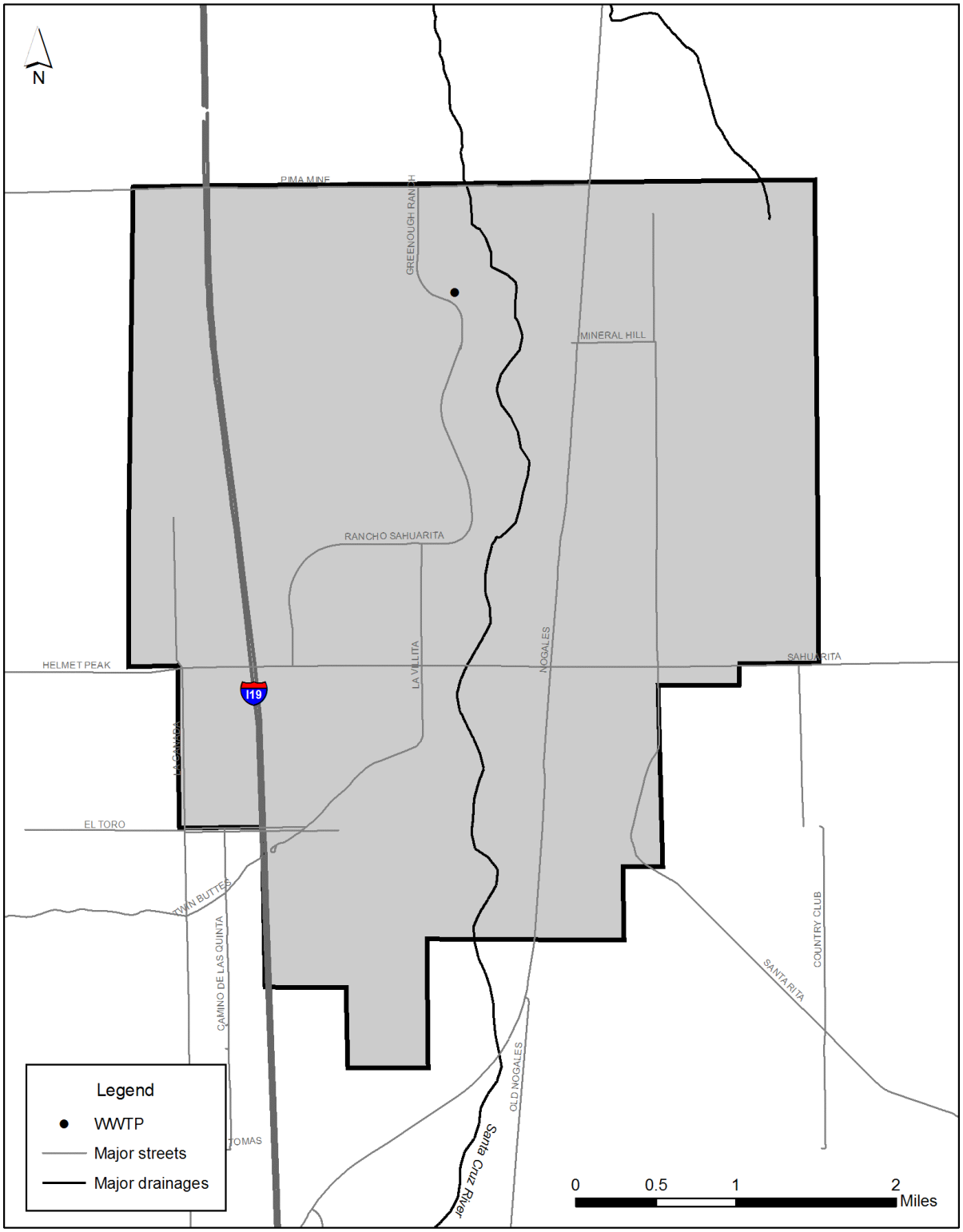
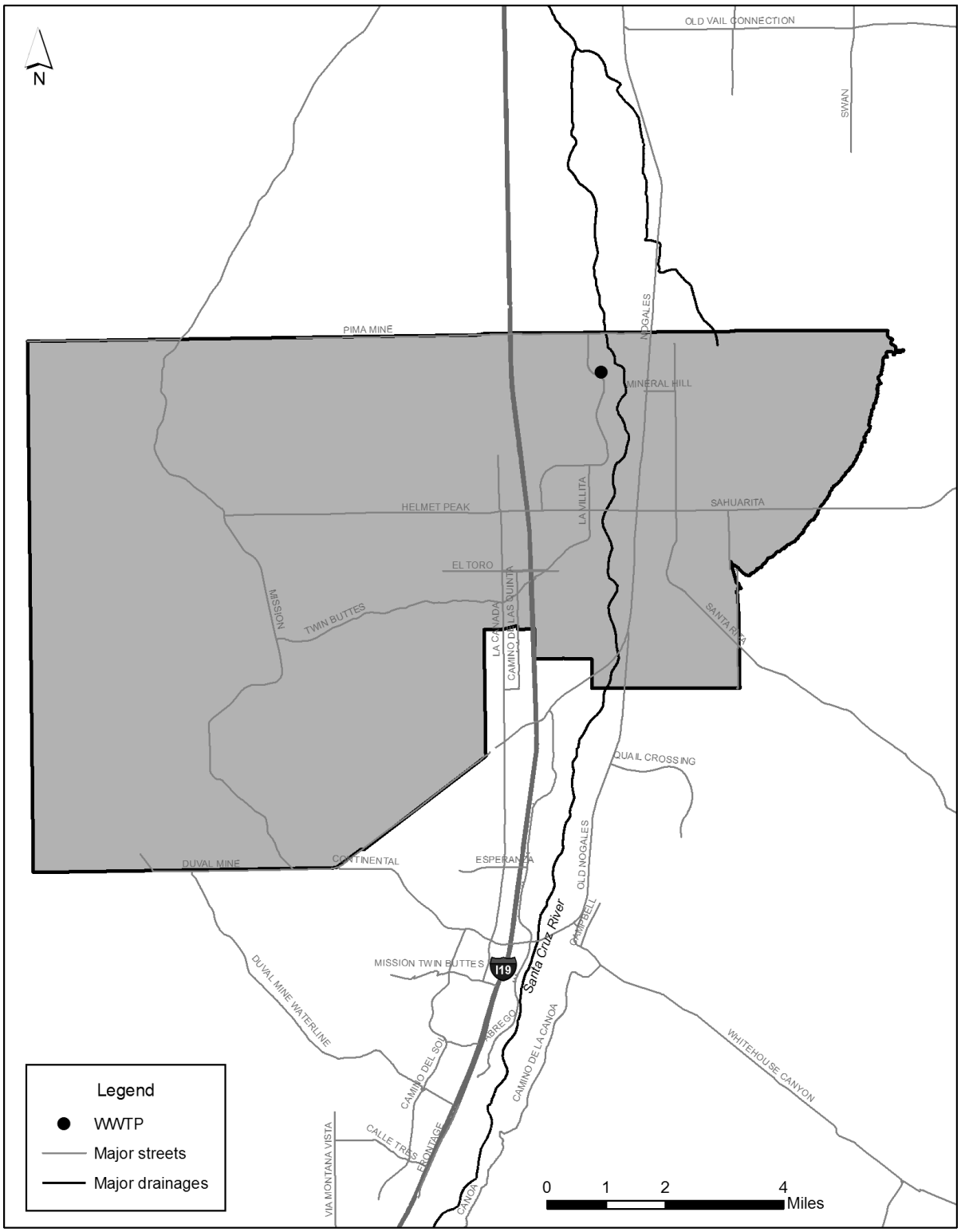


Figure 7-9b. Area Included in Service Area Population Projections for Sahuarita WWTF (includes Joint Planning Areas)



7.3. 208 CONSISTENCY FACTORS

In order to enhance the flexibility of 208 consistency determinations on permit applications for future treatment facility expansions, PAG supplemented the wastewater flow projections by calculating a "208 consistency factor" that will be applied to the future flows projected for each of the above facilities. Proposed expansions of DMAs' wastewater treatment facilities will be deemed consistent with the 208 Plan if the resulting capacity is within the value determined by adding the 208 consistency factor, which is expressed as a percentage, to the WWTF flow projection.

The use of PAG's 208 consistency factors should help streamline the regulatory approval process for DMAs' wastewater treatment facilities. In the past, 208 Plan consistency determinations for facility expansions have been based primarily on whether the proposed capacity matched the flows projected by the 208 Plan. If the proposed capacity was less than or equal to the capacity specified in the 208 Plan, the expansion was deemed consistent, but if it exceeded the flow projection, it might be considered inconsistent. While this has worked well in many cases (particularly for private facilities, the expansions of which are discouraged by PAG's 208 Plan), it has been cumbersome in some cases for proposed expansions of regional wastewater facilities operated by DMAs. Consistency determinations for facility expansions can be hampered if the 208 Plan underestimates future flows to the facility (i.e., if the needed expansion is greater than what the 208 Plan anticipates), even though it is consistent with the PAG 208 Plan's goal of regionalization to assume that DMAs' regional facilities will expand as needed to serve increasing populations in their service areas. The 208 consistency factors that will be applied to the flow projections will help avoid this problem in the future.

PAG assigned a 208 consistency factor of 20% to the large, urban facilities (Roger Rd and Ina Rd) and 80% to the outlying facilities (Avra Valley, Corona de Tucson, Marana, Green Valley and Sahuarita). PAG calculated these factors by determining the magnitude by which the population and flow projections for the facilities would vary, on average, if key assumptions inherent in the projections were changed. In particular, we looked at the assumption that future populations would be distributed evenly across a TAZ in situations where a service area boundary crosses a TAZ. While this is a practical assumption for long-range planning purposes, it is obviously very likely that population will not be evenly distributed. Therefore, we looked at the effect that two extreme scenarios would have on the flow projections: (1) that the population projected in a TAZ crossed by a service area boundary would reside entirely *within* the service area, versus (2) that the population projected in a TAZ crossed by a service area boundary would reside entirely *outside* the service area. We also looked at the assumption that populations served by septic tanks would remain constant, and examined the effect that two extreme scenarios would have on the flow projections: (1) that the entire population would be served by sewers in the future (i.e., zero population on septic tanks); versus (2) that the population served by septic tanks would continue to grow such that the percentage of the population on septic tanks would remain constant. In the cases of the Sahuarita and Green Valley WWTFs, we also looked at the degree to which the populations and flows would vary as a function of varying the size of the future service areas.

By applying the above scenarios to each wastewater treatment facility service area, PAG calculated an extreme lower limit and an extreme upper limit to each flow projection, and the percent variation between these values and their midpoint. We then averaged the results for the large, urban facilities (Ina and Roger) and calculated another average for the rest of the facilities. We rounded the results to the nearest 10 percent, yielding a value of 20% for Ina and Roger and 80% for the other facilities. The 208 consistency factors, along with the flow

projections, are provided on Table 7-4 for Roger Road, Ina Road, Avra Valley, Corona de Tucson, Marana, Green Valley and Sahuarita.

7.4. DISCUSSION OF FUTURE CONDITIONS FOR INDIVIDUAL FACILITIES

7.4.1. Metropolitan Facilities

Metropolitan facilities include Roger Road, Ina Road and Randolph Park. The Roger Road, Ina Road, and Randolph treatment plant collectively could treat approximately 68 MGD as of 2005. Although the plants are geographically separate and generally treat effluent from specific basins, the three plants are operated in an integrated fashion. For example, all solids from these facilities are ultimately dewatered and disposed of from the Ina Road biosolids handling facility. Flows treated at the Randolph facility reduce hydraulic loading at the Roger Road Treatment Plant. Flows are also diverted from the Roger Road facility to Ina Road by way of the Tucson Boulevard Flow Management Structure. Future plans (2004 Bond Funded) for an Ina Road/Roger Road plant interconnect will allow further integration between these facilities. Pima County, the City of Tucson, and other effluent entitlement holders will need to work cooperatively on these plans on a regional basis, so that effluent treatment and disposal needs are balanced with water supply / effluent reuse needs. Pima County is currently assessing alternatives for the future of the Roger Road facility, which needs significant upgrades. If the facility were to be removed from service, more flows would be directed to Ina Road. A significant change in Pima County's treatment options at the Roger Road Wastewater Treatment Plant could impact existing operations at the City's reclaimed water facilities.

7.4.1.1. Roger Road

The population of the Roger Road WWTF service area is expected to grow to 738,416 by the year 2030. Much of the growth projected for the Roger Road WWTF service area is expected to occur at the fringes of the urban area near the extreme ends of the conveyance system. In particular, population growth in the Roger Road service area is expected to occur on Tucson's southeast side, including the Rita Ranch area, the area encompassed by the Houghton Area Master Plan (HAMP), and the Vail area (Figure 7.3). As noted above, population growth in this area will be affected by the timing of land sales by the State Land Department, by various economic factors, and other influences.

7.4.1.2. Ina Road

The population of the Ina Road WPCF service area is expected to grow to 323,233 by the year 2030. Pima County Wastewater Management Department's May 2005 draft Facility Plan Update contains the following language regarding the area tributary to Ina Road.

> *The basins in the Ina tributary system, projected for less aggressive population growth by present PAG projections, and which had been impacted by the restrictions on development due to the Pygmy-Owl presence, have become far more development-active in the past year following easing of Pygmy-Owl restrictions. Although not presently targeted by PAG for explosive growth, Basins 93 (Dove Mountain), and Basins 28, 8 and 85 (see Figure 5.2.4) are experiencing significant development activity. Should potential homeowners find these areas more desirable than areas in the Roger tributary system, flow growth would change from Roger to Ina. Further, future population presently forecast as tributary to one of the Outlying Facilities may change among these facilities or move into the Roger Road WWTP or Ina Road WPCF Tributary areas.*

Given the uncertainty of the location of development within the Metropolitan Tributary System, PCWMD is pursuing a policy of providing maximum flexibility in directing flow and providing capacity at its treatment facilities.

7.4.1.3. Randolph Park

There are no plans to expand the capacity of the Randolph Park water reclamation facility at this time.

7.4.2. Non-Metropolitan Facilities

7.4.2.1. Avra Valley

Flows at this facility are nearing the current 1.2 MGD capacity. According to Pima County's draft facility plan update, the existing facility can be operated at 2.2 MGD with operational and equipment modifications. The next planned expansion of the facility will add 4 MGD of capacity to serve the development currently existing and planned in the area while taking the existing facility out of service for rehabilitation.

7.4.2.2. Corona de Tucson

The Corona de Tucson facility was the subject of a 208 Consistency Report adopted by the PAG Regional Council in December 2004. The Consistency Report addressed a phased expansion to 1.3 MGD from 0.117 MGD. The latest population projections for the service area indicate that by 2030, flows to the facility will reach 2.63 MGD.

7.4.2.3. Marana

A 208 Plan Amendment approved by the PAG Regional Council in 2000 called for the expansion of the Marana WWTF to 3 MGD. The latest population projections for the Marana WWTF's future service area, which is larger in this 208 Plan Update than the service area delineated in the 2000 208 Plan Amendment, indicate that by 2030, flows to the facility will reach 4.44 MGD. However, for this larger area, flows could exceed 4.4 MGD at that time depending on the pace of development.

7.4.2.4. Green Valley

Population projections for the Green Valley WWTP service area in 2030 range from 44,181 to 52,129. The lower projection assumes that the facility will not serve any of the joint planning areas near Sahuarita. The higher projection assumes that the facility will serve all of the joint planning areas. Flow projections range from 3.65 MGD to 4.32 MGD.

7.4.2.5. Sahuarita

Population projections for the Sahuarita WWTF service area in 2030 range from 32,199 to 40,531; flow projections range from 2.74 MGD to 3.45 MGD. The lower projection assumes that the facility will not serve any of the joint planning areas near Sahuarita. The higher projection assumes that the facility will serve all of the joint planning areas. Town of Sahuarita staff have expressed an interest in the possibility of constructing a second facility across the Santa Cruz River from the existing facility, with a plant interconnect between the two. A second facility would reduce the future flows to the existing facility.

7.4.2.6. Arivaca Junction

The Arivaca Junction facility may close. The flows could be diverted to either the Green Valley plant or a package plant at Canoa Ranch to produce reclaimed water that would support an environmental restoration project. A combination of these options is also possible.

7.4.2.7. Rillito Vista

As noted above, PAG did not develop future population and flow projections for the Rillito Vista WWTF, because the facility's future is uncertain. Pima County's draft Facility Plan Update poses the following alternatives for the facility's future:

1) The facility will continue as a limited service facility serving its present customers.
2) The facility will be abandoned with its flow incorporated in the larger Marana WWTF system as a tributary basin.
3) The facility site will be increased in size by additional land purchases and be enlarged to treat the flow from the service area tributary to the Continental Ranch Pump Station (CRWWPS) as well as flows generated by the area east of the Central Arizona Project (CAP) canal and north and south of Tangerine Road.

7.4.2.8. Fairgrounds

The capacity of the Fairgrounds WWTF is anticipated to increase as required to serve the on-site and adjacent property wastewater demands with corresponding facility improvements.

7.4.2.9. Mount Lemmon

Pima County's draft Facility Plan Update contains the following discussion of the Mount Lemmon WWTF:

> The Mount Lemmon sewage system upgrading was included in the 2004 Bond Authorization. This system is entirely within the boundaries of the Coronado National Forest. The US Forest Service has significant input into future plans for growth, water use and effluent disposal for this system. The long-range plans for the future of the Mt. Lemmon sewer system will be evaluated and discussed with the Forest Service and the Mt. Lemmon community prior to implementing any changes or improvements.

7.5. NEW WASTEWATER TREATMENT FACILITIES

The PAG 208 Plan considers the possibility of five new wastewater treatment facilities:

- on Tucson's southeast side;
- near Tangerine Road and Interstate 10;
- near the Pima/Pinal County line
- Canoa restoration project
- on the east side of the Santa Cruz River, across from the existing Sahuarita facility.

Planning for these facilities is in the conceptual stage. The 208 Plan will be updated prior to construction of any of these facilities, when more detailed information is available.

7.5.1. Southeast side facility

The need for a sub-regional facility on the southeast side has been identified in PAG's 208 Plan since 1985, when the Point Source Update for the metropolitan basin (Greeley and Hansen, 1985) was completed. The 1985 update noted that a wastewater reclamation facility would be needed in the Harrison-Pantano target area. The same report also noted that a facility could be needed in the Kolb-Bilby area, but not as soon as the facility in the Harrison-Pantano area.

Pima County's May 2005 draft Facility Plan Update also identifies the need for a southeast side sub-regional facility. According to the facility plan, a wastewater treatment facility providing

reclaimed water to the Tucson Water reclaimed system would be constructed when the flows in the area justify a separate facility. Pima County Wastewater and Tucson Water will need to work together on the plans for using reclaimed water from this facility, and the seasonal nature of demands on the reclaimed water system will need to be addressed. Construction of an underground storage facility in this location might be necessary to accommodate year-round flows. The facility would serve the far east side, including the area encompassed by the Houghton Area Master Plan (HAMP), which is currently within the Roger Road service area. The facility would be owned and operated by Pima County. Pima County Wastewater and the City of Tucson agree that a community facilities district could fund the facility.

7.5.2. Tangerine Road / I-10

The possibility of a future Pima County wastewater treatment facility in the general vicinity of Interstate 10 and Tangerine Road was discussed in the 2000 Marana 208 Areawide Water Quality Management Plan Update. The Plan projects the average dry weather flow (ADWF) for the ultimate build out of the service area, which would include drainage basins east of the CAP aqueduct in the Marana area, as 13.2 MGD. Additional flows from the Marana area would be directed to a new County Line WWTF (see below). Under another scenario discussed in the Marana 2000 update, all flows in the Marana area would be directed to the Tangerine Road / I-10 facility. In this case, the capacity of this facility would be 18 MGD.

7.5.3. County line

The 2000 Marana Areawide Water Quality Management Plan Update proposed construction of a new Pima County regional wastewater treatment facility at or near the Pima / Pinal County line. One alternative considered in the 2000 Marana update was to direct all of the Marana area flows to the new County Line facility, in which case the facility's ultimate capacity would be 18 MGD. Under a different alternative that was considered, in which a new Tangerine Road / I-10 facility would also be constructed, the County Line WWTF would have an ultimate capacity of 4.8 MGD.

7.5.4. Canoa restoration project

Pima County's draft Multi Species Conservation Plan (Pima County, 2006) includes a possible environmental restoration project at Canoa Ranch south of Tucson. County staff have discussed the possibility of a future WWTF that would provide treated effluent for the restoration project.

7.5.5. Sahuarita

The 1999 Sahuarita 208 Plan Amendment only addressed service west of the Santa Cruz River. The Town has since annexed areas to the east. Properties located east of the Santa Cruz River and within either the Town's DMA or the Joint Planning Area could be served by a new facility constructed east of the Santa Cruz River, roughly across from the existing WWTF. A plant interconnect between the two facilities could provide the Town with increased operational flexibility.

7.6. SOUTHLANDS

According to the City of Tucson Department of Planning and Urban Design (2004), the "Southlands" area (Figure 7-10) of the Tucson metropolitan area encompasses 1083 square miles; it includes 868 vacant square miles, 418 of which are Arizona State Trust Lands. The Southlands includes areas within and outside the Tucson city limits, with most of the Southlands

area within the City annexed since 1980. The area is growing at a rate that is outpacing both the City and the region.

At this time, plans for wastewater service to the Southlands area have not been finalized. Either a new regional or sub-regional facility would need to be constructed, or the flows would be conveyed to the Roger/Ina facilities. A future 208 Plan Amendment may be needed to address wastewater service for the Southlands.

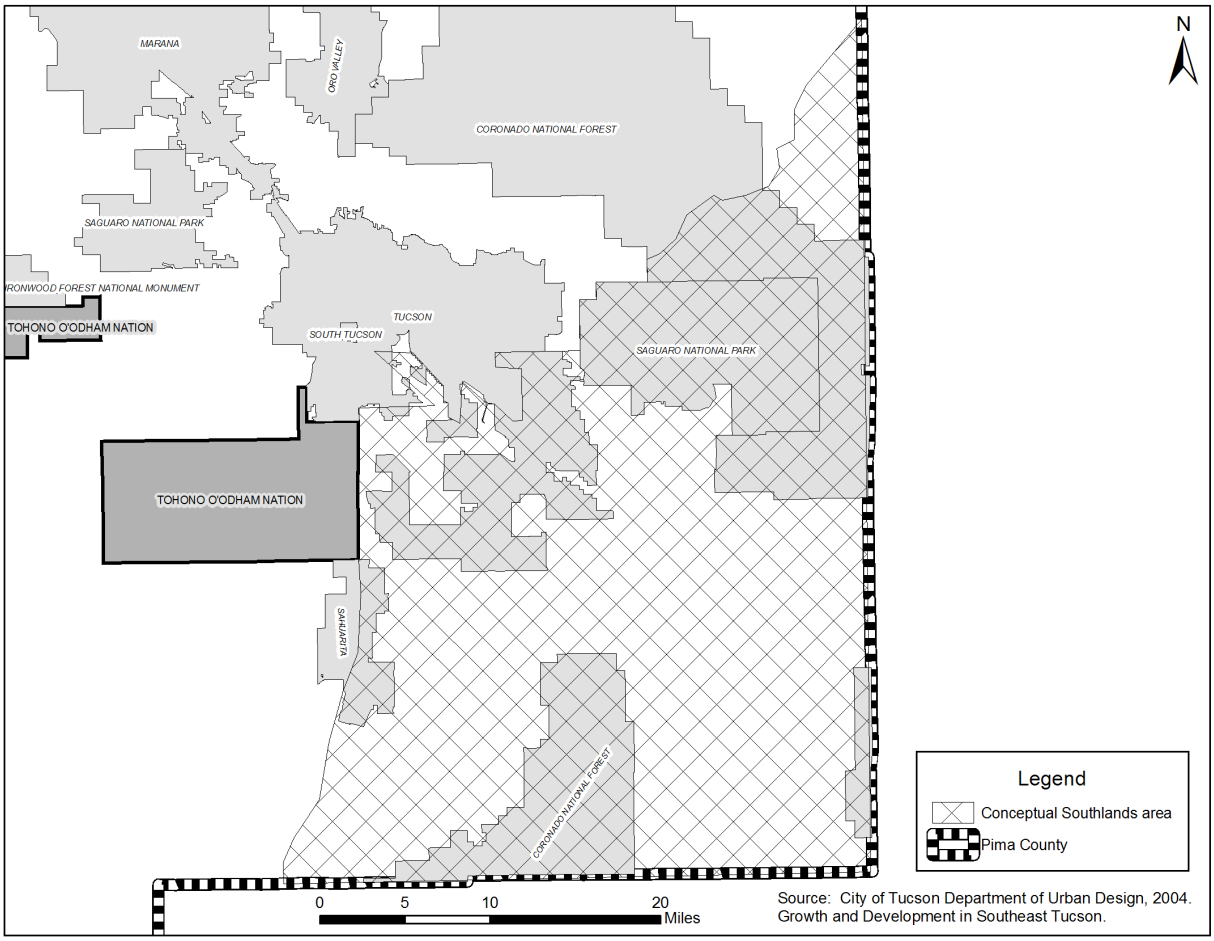
7.7. NON-PUBLIC FACILITIES

Table 7-5 lists non-public WWTFs in Pima County and includes the potential future capacities identified in this 208 Plan Update or previous 208 Plan Amendments.

Table 7-5. Future Capacities for Non-Public Facilities

Facility	*Future Capacity*
Adonis MHP	No expansion anticipated. Plant closure and connection to regional system, when available, is recommended
Ajo Improvement Co.	0.6 MGD
Arizona State Prison	Not consistent with 208 Plan – no expansions allowed
Desert Museum	No expansion of service area anticipated; if necessary, treatment capacity could be expanded to continue serving the museum grounds if greater wastewater volumes are generated in the future
Lukeville	0.01 MGD; no expansion anticipated
Marana High School	0.07 MGD; plant will eventually connect to regional system
Milagro Subdivision	No expansion anticipated; facility will only serve the subdivision
MTC	0.13 MGD
Organ Pipe Cactus National Monument	No expansion of service area anticipated; if necessary, treatment capacity could be expanded to continue serving the park if greater wastewater volumes are generated in the future
Saguaro Ranch Guest Ranch (proposed)	Approx. 0.016 MGD; no expansions anticipated; the facility will only serve the guest ranch
Sahuarita High School Wetlands	No expansions anticipated; facility will only serve the school, and it may connect to the Town of Sahuarita system.
University of Arizona Science and Technology Park	0.15 MGD
U.S. Forest Service Palisades Ranger Station	No expansions anticipated; facility only serves the ranger station

Figure 7-10. Southlands Area



8. WATERSHED APPROACH TO WATER QUALITY MANAGEMENT PLANNING

Section 208 of the 1972 Amendments to the Federal Water Pollution Control Act (later known as the Clean Water Act, with Section 208 being codified at 33 USC §1288) required the Governor of each state to identify areas having water quality problems, delineate the boundaries of the areas and designate for each area a single representative organization that would develop plans for each area. In Arizona, the Governor delineated areas along political (i.e., county) boundaries. One of the areas delineated was Pima County, and the Governor designated PAG as the planning organization for that area. PAG subsequently developed its original 1978 Section 208 Areawide Water Quality Management Plan for Pima County.

Parts of PAG's original 208 Plan, particularly the non-point source elements, were developed on a watershed basis to a limited extent. For example, the 1978 document included figures showing watersheds delineated at varying scales for areas inside and outside the urban window. The plan also included soil losses and certain pollutant loads that were calculated on a watershed basis. However, 208 Planning in Pima County and throughout Arizona has mostly been done on a political-boundary basis.

EPA has increasingly emphasized a watershed-based approach to address water quality problems. In 2002, EPA expressed a renewed commitment to advancing the watershed approach, stating that "such an approach, which focuses multi-stakeholder efforts within hydrologically defined boundaries to protect and restore our aquatic resources and ecosystems, offers the most cost-effective opportunity to tackle today's challenges" (EPA, 2002). Also, as noted in the introduction of this report, EPA has placed increasing emphasis on Total Maximum Daily Loads (TMDL) and nonpoint source pollution control.

In 1997, ADEQ prepared a draft Statewide Watershed Framework document (ADEQ, 1997a), which "describes how water protection efforts can be organized along watershed boundaries. A watershed framework supports partnering, using sound science, taking well-planned actions and achieving results. ADEQ's multi-disciplinary watershed management approach is evolving and being used to solve tough problems." (ADEQ, 2005h). ADEQ's Nonpoint Source State Management Plan (ADEQ, 2003) notes that ADEQ continues to work with the Designated Planning Agencies on incorporating a watershed-based approach into the 208 process. ADEQ (2003) further notes that "this is a slow process because the DPAs were established on political jurisdictional lines and pollution knows no boundaries."

In order to be consistent with EPA's and ADEQ's emphasis on watershed planning, PAG intends to transition its 208 Planning process to a watershed-based approach. This will involve a number of challenges, some of which can be partially addressed by this update. Others will take more time.

Two key challenges that must be addressed when attempting to incorporate a watershed-based approach to 208 planning, and which can be discussed in this 208 plan update, are:

- choosing a watershed scale
- avoiding or resolving difficulties with planning (and implementing plans) across jurisdictional boundaries

8.1. WATERSHED SCALE

The scale of a watershed can range anywhere from an unnamed tributary near the headwaters of a mountain stream (perhaps a few square miles within a single county) to the entire watershed for a large river, such as the Colorado, encompassing many states and crossing an international border. Choosing a very small scale for a watershed would have the advantage that most watersheds would be under a single jurisdiction and possibly even under a single land owner. This would minimize the need for coordination among different jurisdictions and land owners, and it would simplify the development of the management plan for that watershed. The obvious disadvantage is that planning on a very small scale would result in an extremely large number of watersheds for which individual plans would be needed and coordinated with. It would also defeat the purpose of planning for water quality management on a regional basis.

At the other end of the spectrum, watershed planning on the scale of the Colorado River would have the advantage that most of Arizona would fall within a single watershed planning area, thus minimizing the number of plans. However, development and implementation of the plan would be enormously complex and involve an unreasonably large number of cities, towns, counties, tribes, states and nations. It is clearly the intent of the Clean Water Act that states take individual responsibility for water quality management, and that water quality management planning be conducting on a sub-state scale. Therefore, planning on the scale of the Colorado River watershed would not be an appropriate choice for incorporating a watershed-based approach into the 208 process.

One way to differentiate scales or resolutions of watersheds is by using the U.S. Geological Survey's Hydrologic Unit Codes (HUC). EPA's "Surf Your Watershed" Web site (http://www.epa.gov/surf/) provides maps and lists of watersheds, according to their HUC, by state and by county. The USGS Web site (http://water.usgs.gov/GIS/huc.html) has an excellent explanation of HUCs:

> The United States is divided and sub-divided into successively smaller hydrologic units which are classified into four levels: regions, sub-regions, accounting units, and cataloging units. The hydrologic units are arranged within each other, from the smallest (cataloging units) to the largest (regions). Each hydrologic unit is identified by a unique hydrologic unit code (HUC) consisting of two to eight digits based on the four levels of classification in the hydrologic unit system.
>
> The first level of classification divides the Nation into 21 major geographic areas, or regions. The second level of classification divides the 21 regions into 222 subregions. A subregion includes the area drained by a river system, a reach of a river and its tributaries in that reach, a closed basin(s), or a group of streams forming a coastal drainage area. The third level of classification subdivides many of the subregions into accounting units. These 352 hydrologic accounting units nest within, or are equivalent to, the subregions. The fourth level of classification is the cataloging unit, the smallest element in the hierarchy of hydrologic units. [Efforts are under way to add further levels of subdivisions.] A cataloging unit is a geographic area representing part or all of a surface drainage basin, a combination of drainage basins, or a distinct hydrologic feature. These units subdivide the subregions and accounting units into smaller areas. There are 2150 Cataloging Units in the nation. Cataloging Units sometimes are called "watersheds."

Under the USGS HUC system, PAG's Designated Planning Area lies entirely within the Lower Colorado Region (Region 15) and includes parts of Subregions 1505 (Middle Gila), 1507 (Lower Gila) and 1508 (Sonora). Within these subregions, there are five accounting units in PAG's area:

Middle Gila (1505)
- San Pedro-Willcox (150502)
- Santa Cruz (150503)

Lower Gila (1507)
- Lower Gila (150702)

Sonora (1508)
- Rio Sonoyta (150801)
- Rio De La Concepcion (150802)

PAG's area contains all or parts of 14 watersheds at the cataloging unit scale (EPA, 2005a):

San Pedro-Willcox (150502)
- 15050202 Upper San Pedro
- 15050203 Lower San Pedro

Santa Cruz (150503)
- 15050301 Upper Santa Cruz
- 15050302 Rillito
- 15050303 Lower Santa Cruz
- 15050304 Brawley Wash
- 15050305 Aguirre Valley
- 15050306 Santa Rosa Wash

Lower Gila (150702)
- 15070202 Tenmile Wash
- 15070203 San Cristobal Wash

Rio Sonoyta (150801)
- 15080101 San Simon Wash
- 15080102 Rio Sonoyta
- 15080103 Tule Desert

Rio De La Concepcion (150802)
- 15080200 Rio De La Concepcion

These watersheds range in size from 125 square miles (Rio De La Concepcion) to 2,210 square miles (Upper Santa Cruz) (USGS, 2005). The USGS HUC system does not extend beyond the nation's borders. Thus many watersheds in southern Arizona are delineated such that their southern boundary corresponds to the international border with Mexico.

At the cataloging unit scale, 84 watersheds lie partly or entirely within Arizona (EPA, 2005b). ADEQ has consolidated these 84 watersheds into 10 larger watersheds statewide that are distinct from the USGS HUC system (ADEQ, 1997a):

- Bill Williams
- Colorado - Grand Canyon
- Colorado - Lower Gila
- Little Colorado - San Juan
- Middle Gila
- Salt
- San Pedro - Willcox Playa - Rio Yaqui
- Santa Cruz - Rio Magdalena - Rio Sonoyta
- Upper Gila
- Verde

At the state level, division of the state into 10 watersheds, by consolidating individual cataloging unit watersheds into larger watersheds, is a practical choice for coordinating a variety of programs statewide. Coincidentally, it is somewhat comparable in scale to the division of the state into eight Designated Planning Areas and Planning Agencies under Section 208.

However, at the regional (i.e., Designated Planning Agency) level, it is more useful in many ways to conduct watershed planning at the scale of the cataloging units. For example, in PAG's Designated Planning Area, ADEQ has consolidated most of Pima County into the "Santa Cruz / Rio Magdalena / Rio Sonoyta" watershed. The individual cataloging units within this larger watershed include the Upper Santa Cruz, the Lower Santa Cruz, Brawley Wash, Rillito, San Simon Wash, and others. These individual watersheds are distinct from one another. The Upper Santa Cruz and Rillito watersheds encompass much of the Tucson metropolitan area and include a Unique Water, several perennial streams flowing down the slopes of high mountains, and an effluent dependent water, whereas the Brawley Wash watershed is predominantly rural in nature, consisting of low-elevation desert rangeland. The Sam Simon Wash watershed is within the low-elevation desert of the Tohono O'odham Nation. Given the diversity of the individual watersheds within ADEQ's larger watersheds, it is more appropriate for PAG to conduct watershed planning in its Designated Planning Area at a cataloging-unit resolution or finer.

Planning at a resolution finer than that of the cataloging unit will be necessary in many cases, including management of Unique Waters and development of TMDLs for impaired waters. For example, plans for managing Cienega Creek, a Unique Water in a rural area southeast of Tucson, would need to be made at a resolution finer than the scale of the entire Rillito watershed, which encompasses much of the eastern half of the Tucson metropolitan area (downstream of Cienega Creek) and which therefore has numerous issues not pertinent to the management of Cienega Creek. Likewise, the draft TMDL for Lakeside Lake, an artificial urban lake fed by reclaimed water and stormwater runoff on Tucson's east side, does not (and should not) address all pollutant sources in the entire Rillito watershed.

8.2. PLANNING ACROSS JURISDICTIONAL BOUNDARIES

Traditionally, land use planning has been conducted by local town, city and county governments, Metropolitan Planning Organizations and regional Councils of Governments. The plans developed by these entities typically only encompass the areas within their jurisdictions.

With watershed-based planning, however, plans are based on hydrologic boundaries, rather than political boundaries.

Transitioning from planning on a political boundary basis to a watershed basis is a challenge, because government entities with the legal authority to develop and implement plans and enforce environmental regulations do not have any authority to carry out these activities beyond their jurisdictional limits (i.e., outside the city, town, or county boundaries). In very few cases do jurisdictional boundaries correspond to watershed boundaries, thus precluding local governments from planning for entire watersheds (particularly if the watersheds are large). If such plans were made, they would be difficult to implement because most entities would lack the authority to implement the plans.

If Arizona were to transition completely to watershed-based planning under Section 208 of the Clean Water Act, the Governor would presumably rescind the designations of the current planning agencies and planning areas statewide, and designate new planning area boundaries across the state, corresponding to the boundaries of Arizona's watersheds, "after consultation with appropriate elected and other officials of local governments having jurisdiction in such areas." {Clean Water Act §208(a)(2) 33 USC §1288 (a) (2)}. For each watershed, the Governor would then designate a new planning agency consisting of "a single representative organization, including elected officials from local governments or their designees, capable of developing effective area wide waste treatment management plans for such area" {Clean Water Act §208(a)(2)}.

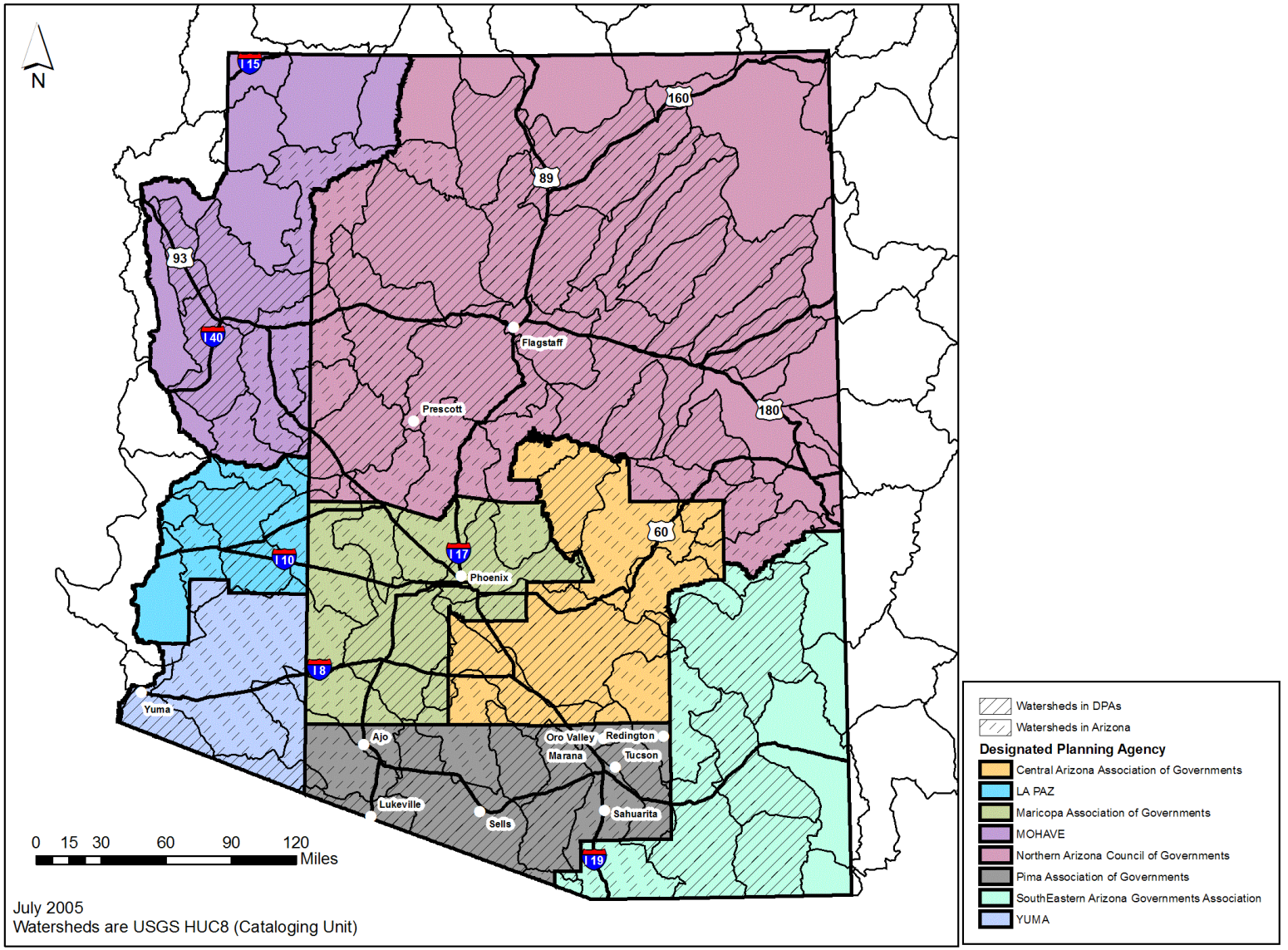
The scenario described above would be exceedingly difficult to implement, considering that for most watersheds, no such organizations currently exist, and considering that the jurisdictions of local governments do not usually correspond to watershed boundaries. Furthermore, the Clean Water Act requires that these newly created organizations would have a waste treatment planning process in place within a year of being designated; within two years a plan would have to be certified by the Governor and submitted to EPA.

Such a transition is clearly outside the scope of this update to PAG's 208 Plan. Instead, PAG is attempting with this update to take initial steps toward incorporating the principles of watershed-based planning into the existing planning structure that is founded upon political jurisdiction boundaries.

The principal advantage of PAG's approach is that it does not necessitate the creation of new organizations and preparation of new plans from scratch, and instead relies on existing organizations (Designated Planning Agencies and Designated Management Agencies) with the experience and authorities to carry out the planning and management activities needed to protect water quality in the region. The existing Designated Planning Agencies represent multiple local governments and thus increase the extent to which local governments can cooperatively conduct watershed planning outside their individual jurisdictional boundaries.

The large geographic extent of the existing Designated Planning Areas (encompassing at least an entire county and in several cases multiple counties) results in many watersheds falling entirely (or almost entirely) within an existing DPA, thus helping to minimize the problems associated with planning across jurisdictional boundaries. Of Arizona's 84 watersheds, 59 lie completely within Arizona. The other 25 watersheds extend into adjoining states. Of the 59 watersheds completely within Arizona, 38 lie completely within single Designated Planning Areas. The other 21 watersheds cross boundaries between the DPAs (Figure 8-1).

Figure 8-1. Watersheds in Arizona and Designated Planning Area Boundaries



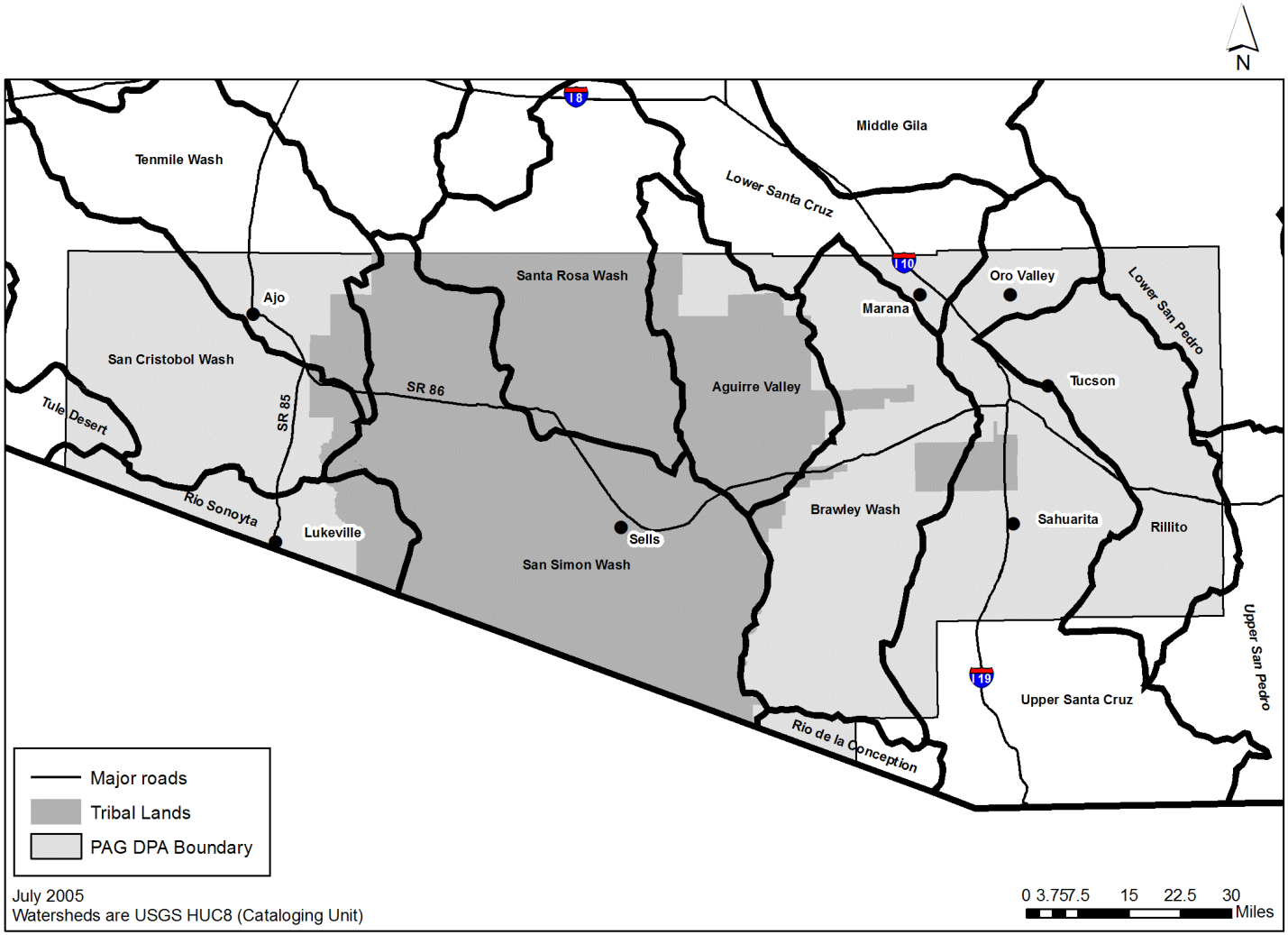
In PAG's area, five of the 14 watersheds lie almost completely within Pima County (Figure 8-2): San Simon Wash, Brawley Wash, Rio Sonoyta, Rillito and Aguirre Valley. One of the most significant watersheds (in terms of population, land use and water resources) in the PAG area is the Upper Santa Cruz. Most of this watershed is within PAG's area, but a large portion of the headwaters are within the SouthEastern Arizona Governments Association (SEAGO) area (in Santa Cruz county), and the downstream end of the watershed is in Central Arizona Association of Governments' (CAAG) area (in Pinal County). A small part of the Lower Santa Cruz watershed is within PAG's area. The bulk of this watershed is within CAAG, although a small part at the northwest end is within MAG's area. PAG's area also includes a small part of the San Pedro watershed. The rest of the San Pedro watershed is divided roughly evenly between SEAGO and CAAG. The remaining watersheds in PAG's area (Santa Rosa Wash, Tenmile Wash, San Cristobal Wash and Rio Sonoyta) are located in the very arid, sparsely populated reaches of western Pima County. Much of these watersheds are comprised of tribal lands and federal lands.

The small, unincorporated community of Ajo is in the southern, upstream reaches of the Tenmile watershed, in the northwest corner of Pima County. This watershed extends into the Maricopa Association of Governments (MAG) and Yuma County planning areas. However, most of the watershed downstream from Ajo, outside Pima County, is very arid land with minimal water resources and population. Much of it is within the Barry Goldwater Air Force Range. For these reasons, the likelihood of any water quality issues in this watershed spanning multiple planning areas is minimal.

The far northeast corner of Pima County is in the Lower San Pedro watershed. This is a sparsely populated area on the opposite side of the Santa Catalina Mountains from Tucson, and it only represents a small part of the Lower San Pedro watershed, most of which is located in the SEAGO and CAAG areas. However, the part of the watershed in Pima County includes a number of very important natural aquatic habitat resources, including perennial waterbodies like Bingham Cienega (a rare wetland), Buehman Canyon (a Unique Water), and a perennial reach of the San Pedro River itself. Planning in this area should occur at the scale of the watersheds for the individual tributaries to the San Pedro River, rather than at the scale of the entire Lower San Pedro River watershed. This would take into account the specific challenges and needs associated with the individual waterbodies in this area, and it would minimize the need for planning across jurisdictional boundaries.

The vast majority of the population, economic development and water resources in Pima County are in eastern Pima County, in the Upper Santa Cruz, Rillito and Brawley Wash watersheds. Since the Brawley Wash and Rillito watersheds lie entirely or almost entirely within PAG's planning area, PAG can plan for these areas without much need to cross jurisdictional boundaries. Much of the Upper Santa Cruz watershed is within PAG's area, and PAG can plan for the Pima County portion of this watershed. Planning for the Upper Santa Cruz watershed as a whole, however, including the southern and northern limits, will require coordination with CAAG and SEAGO. This can be accomplished through the statewide Water Quality Management Working Group, which meets regularly to discuss water quality plans and issues, particularly updates and amendments to 208 Plans. As a formal advisory body to ADEQ, the Water Quality Management Working Group has the ability to play a strong role in ensuring that coordination of planning across DPA boundaries will occur.

Figure 8-2. Watersheds within PAG's Designated Planning Area



8.3. NINE KEY ELEMENTS OF A WATERSHED PLAN

EPA recommends that whenever feasible, watershed-based plans be developed and implemented for all watershed projects, whether they are designed to protect unimpaired waters, restore impaired waters, or both. Accordingly, EPA has issued guidelines to promote the use of Section 319 funding for developing and implementing watershed-based plans [Federal Register: October 23, 2003 (Volume 68, Number 205)]. These guidelines include nine key elements that must be included in watershed-based plans to restore waters impaired by nonpoint source pollution using incremental Section 319 funds. The nine key elements are:

1) identification of the causes and sources or groups of similar sources that will need to be controlled to achieve the pollution load reductions estimated in this watershed-based plan (and to achieve any other watershed goals identified in the watershed-based plan);

2) an estimate of the load reductions expected for the management measures described in paragraph 3 below;

3) A description of the non-point source (NPS) management measures that will need to be implemented to achieve the load reductions estimated in paragraph 2 above (as well as to achieve other watershed goals identified in this watershed-based plan);

4) an estimate of the amounts of technical and financial assistance needed, associated costs, and/or the sources and authorities that will be relied upon, to implement this plan;

5) an information/education component that will be used to enhance public understanding of the project and encourage their early and continued participation in selecting, designing and implementing the NPS management measures that will be implemented;

6) a schedule for implementing the NPS management measures identified in this plan that is reasonably expeditious;

7) a description of interim, measurable milestones for determining whether NPS management measures or other control actions are being implemented;

8) a set of criteria that can be used to determine whether loading reductions are being achieved over time and substantial progress is being made toward attaining water quality standards and, if not, the criteria for determining whether this watershed-based plan needs to be revised or, if a NPS TMDL has been established, whether the NPS TMDL needs to be revised; and

9) a monitoring component to evaluate the effectiveness of the implementation efforts over time, measured against the criteria established under item 8 immediately above.

Incorporation of all nine elements into PAG's plan update is outside the scope and focus of this project. The nine elements are geared primarily toward waterbodies impaired by nonpoint

source pollution. In the future, if a waterbody in PAG's area becomes impaired due to nonpoint source pollution in the watershed, a watershed-based water quality improvement plan (TMDL) incorporating these nine elements would likely be developed if Section 319 funds are sought.

EPA also states in its guidance [Federal Register: October 23, 2003 (Volume 68, Number 205)] that "watershed-based plans should address not only the sources of water quality impairment, but also any pollutants and sources of pollution that need to be addressed to assure the long-term health of the watershed, including both surface and ground water that serve as sources of drinking water."

8.4. INITIAL ELEMENTS OF A WATERSHED-BASED WATER QUALITY MANAGEMENT PLAN FOR THE PAG PLANNING AREA

As a first step toward implementing the areawide water quality management plan on a watershed basis, PAG has inventoried wastewater treatment facilities and other potential sources of pollutant discharges for selected watersheds in the region (those encompassing most of the population, point source discharges, perennial streams and developed water resources). This is consistent with EPA's guidance noted above (that watershed-based plans should address any sources that need to be addressed to assure the long-term health of the watershed). The WWTF inventory is also consistent with key element "1" of the nine key elements, which is an inventory of sources. In addition, a discussion of education/public information and monitoring components of the plan is provided, consistent with elements "5" and "9" above. Key features in the watersheds, such as impaired waters, Unique Waters[5] and perennial streams are also included in the discussion. Table 8-1 provides a summary of the features in each watershed.

8.4.1 Lower San Pedro

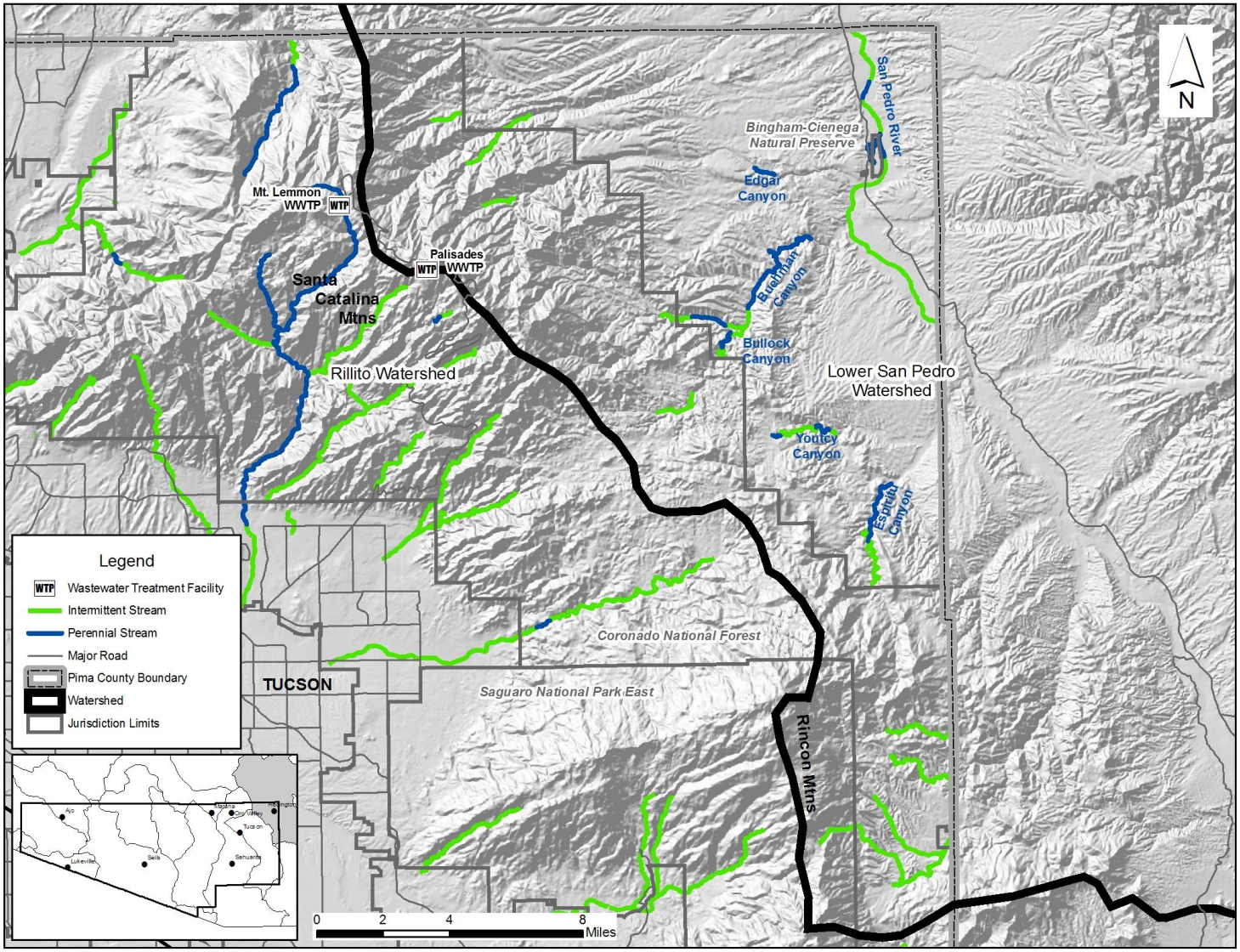
Several sub-watersheds within the PAG portion of the Lower San Pedro watershed (Figure 8-3) include important perennial streams that provide aquatic and riparian habitat for native species. These streams, which drain the northeast slopes of the Santa Catalina Mountains and Rincon Mountains, include Buehman Canyon (a Unique Water), Edgar Canyon, Bullock Canyon (which flows into Buehman), Espiritu Canyon and Youtcy Canyon. This area also includes Bingham Cienega, a rare low-elevation perennial wetland. The San Pedro River itself is also perennial in this area. There are no impaired waterbodies in the PAG portion of the San Pedro watershed.

There are no wastewater treatment facilities in this area. However, the Mount Lemmon WWTF discharges effluent via spray irrigation in the Corona National Forest within the boundaries of the Lower San Pedro watershed. There are no other permitted point sources of pollutants.

The PAG portion of the Lower San Pedro watershed area is sparsely populated, and wastewater is treated with individual on-site septic systems. There are no incorporated cities or towns; the small community of Redington, along the San Pedro River, is unincorporated. Potential non-point sources of pollutants include cattle grazing, mining, septic tanks and irrigated cropland along the river. Sediment transport enhanced by recent forest fires is an additional nonpoint source concern.

[5] Under Arizona's Water Quality Standards Rules, a Unique Water is "a surface water that is classified as an outstanding state resource water by the Director under R18-11-112."

Figure 8-3. Lower San Pedro Watershed in Pima County



8.4.1.1 Monitoring

ADEQ's 2004 305(b) report indicates that Buehman Canyon and the San Pedro River were monitored in 1999, 2000, 2001 and 2002. Buehman was found to be attaining all uses, while the San Pedro was found to be inconclusive for the Aquatic and Wildlife and Full Body Contact uses due to E. coli exceedances and former turbidity standard exceedances. PAG sampled surface water quality in Edgar Canyon, the San Pedro River and Bingham Cienega seven times between 1998 and 2000 for an investigation to determine the source of water at Bingham Cienega.

8.4.1.2 Education and Public Information

PAG does not conduct regular public education or outreach in, or about, the San Pedro watershed. However, we hosted a large public forum on riparian area restoration and management in December 2003. One of the projects featured at this forum was located at Bingham Cienega.

8.4.2 Upper Santa Cruz

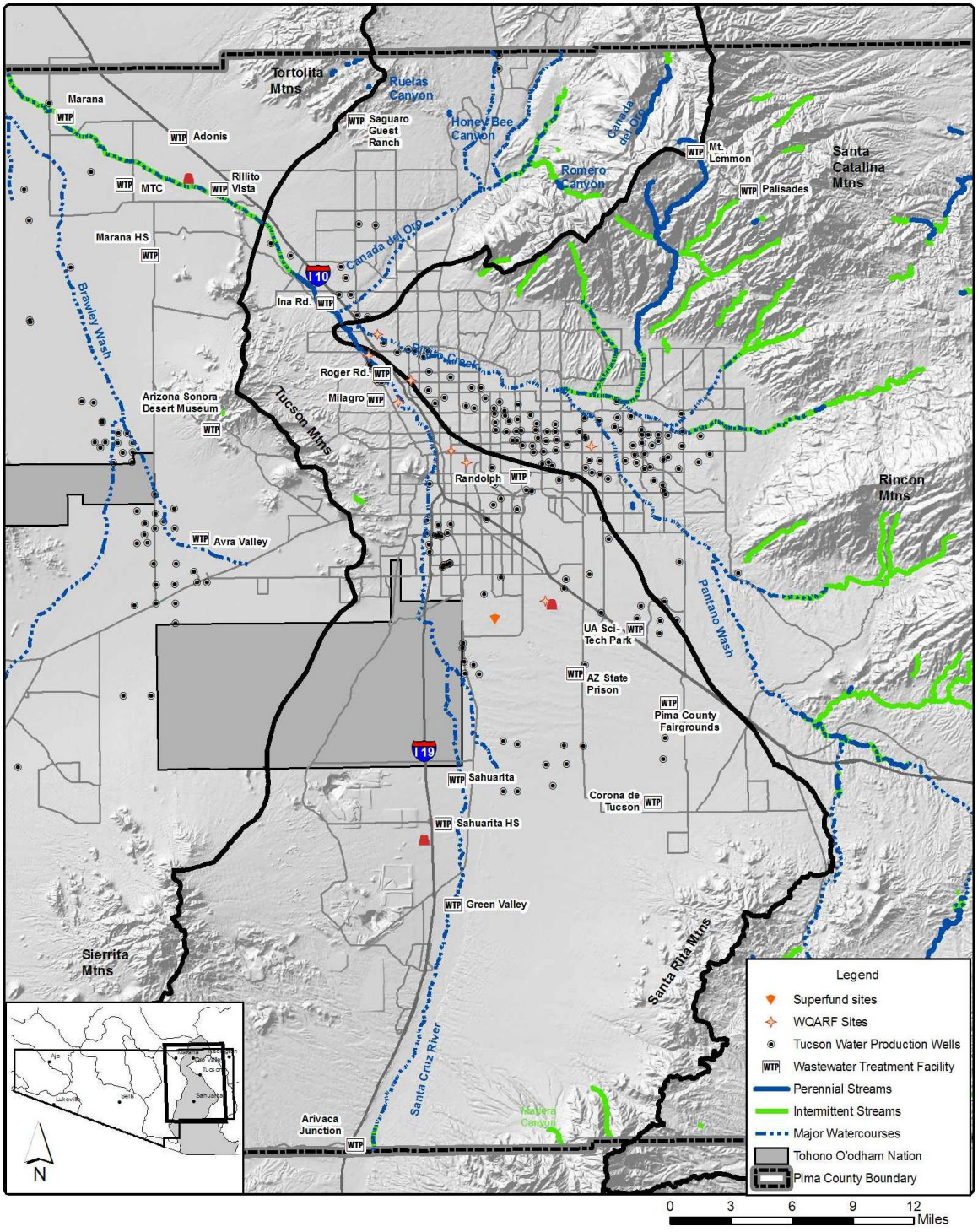
Along with the Rillito watershed, the Upper Santa Cruz watershed (Figure 8-4) is one of the two most heavily populated watersheds in PAG's planning area. It encompasses the western part of the Tucson metropolitan area, including downtown Tucson and Oro Valley. A large number of production wells supplying the Tucson area's municipal water needs are within this watershed, making it a very important water resource for the region.

Most of the wastewater treatment facilities in PAG's area are located in the Upper Santa Cruz watershed:

- Arivaca Junction
- AZ State Prison
- Corona de Tucson
- Green Valley
- Ina Rd.
- Milagro
- Mt. Lemmon
- Pima County Fairgrounds
- Randolph
- Roger Rd.
- Sahuarita
- Sahuarita High School
- UA Science/Tech Park

Two facilities in the Upper Santa Cruz watershed that are outside PAG's planning area but worthy of mention here are the Nogales International WWTF in SEAGO's area and the Saddlebrooke WWTF in CAAG's area. Because of its large size (14.5 MGD average daily inflow in 2004), upstream location, and history of large floods along the Santa Cruz River, the Nogales facility could be relevant to watershed-based plans for the reach of the Santa Cruz River in southern Pima County. The Saddlebrooke facility discharges to a tributary of the Canada del Oro Wash. Because the Canada del Oro is a significant source of groundwater recharge for the Oro Valley area, facilities in the upstream reaches of this watershed are of interest to Oro Valley.

Figure 8-4. Upper Santa Cruz Watershed in Pima County



Within PAG's planning area, the Upper Santa Cruz contains six Water Quality Assurance Revolving Fund (WQARF) sites, the Tucson International Airport Area Federal Superfund Site, and the Davis-Monthan Air Force Base Department of Defense site. Nonpoint source issues include urban runoff (which is managed under several municipal stormwater AZPDES permits), irrigated agriculture, grazing, mining and wildcat dumping. In addition, recent wildfires in the Santa Catalina Mountains have increased sediment loads in some drainages. Twenty closed landfills are within the watershed, as are the active Los Reales landfill and active Sahuarita No. 2 landfill. Mining is a significant land use in the Green Valley area, south of Tucson. The closed landfills are:

- Catalina #1
- Catalina #2
- Cortaro
- Camino del Cerro
- Silverbell/Jail Annex
- State Pit
- Dragoon
- St. Mary's
- Rio Nuevo North
- Rio Nuevo South
- A Mountain
- Tumamoc
- Mission
- 29th Street
- Ryland
- Cottonwood
- Old Nogales
- Rita Road
- Sahuarita #1
- Ina Rd (open for inert materials only)

PAG's portion of the Upper Santa Cruz watershed includes several perennial stream reaches: Upper Canada del Oro, Romero Canyon, Honey Bee Canyon and Ruelas Canyon. The Upper Canada del Oro and Romero Canyon are in the Santa Catalina Mountains, while Honey Bee Canyon and Ruelas Canyon are in the Tortolita Mountains. The Santa Cruz River is perennial downstream of Tucson because of constant effluent discharges from the Roger Road and Ina Road wastewater treatment facilities. Madera Canyon, a national renowned birding area in the Santa Rita Mountains, is one of many intermittent streams of note.

No Unique Waters or impaired waters are within PAG's part of the Upper Santa Cruz watershed.

8.4.2.1 Monitoring

PAG, ADEQ, the USGS, and numerous local entities monitor this watershed extensively. ADEQ, the USGS, and Pima County Wastewater Management Department monitor the effluent dependent reach of the Santa Cruz River near Tucson regularly at several locations. PAG has conducted many studies in this watershed, including a recent well inventory along the Santa Cruz River, and recent studies at Arivaca Creek and Sopori Wash. Various water providers conduct water quality and water level monitoring at numerous wells in the Santa Cruz watershed. Local municipalities with stormwater AZPDES permits monitor urban runoff.

Groundwater quality at the Federal Superfund and state WQARF sites is monitored intensively. Surface water and groundwater quality monitoring at wastewater treatment facilities occurs in accordance with the facilities' permits.

8.4.2.2 Education and Public Information

PAG actively educates the public and disseminates public information in and about this watershed, along with the Rillito, Lower Santa Cruz and Brawley Wash watersheds (see below). PAG maintains extensive mailing lists for its Environmental Planning Advisory Committee and Watershed Planning Subcommittee, and information is regularly disseminated to parties on these lists. The committees meet regularly, and PAG also hosts large public forums on a variety of watershed topics at least once a year. PAG and many other local entities maintain Web sites and publicly accessible libraries with information about the watershed.

PAG and its member jurisdictions have recently focused on educating the public about preventing stormwater pollution. The education campaign has included targeted outreach to specific industries and also the general public, in the form of bus ads, bus shelter posters and radio spots.

8.4.3 Rillito

As noted above, the Rillito watershed (Figure 8-5) is one of the two most heavily populated watersheds in PAG's planning area. It includes much of central and eastern Tucson as well as the northern Tucson suburbs in the foothills of the Santa Catalina Mountains. Part of the rapidly growing Vail area on the Tucson metropolitan area's far southeast side is also in this watershed. Very little of the watershed extends beyond PAG's planning area boundaries, minimizing cross-jurisdictional planning issues.

Two wastewater treatment facilities are located within this watershed: the Mount Lemmon WWTF and the Palisades Ranger Station WWTF. Both are in the Santa Catalina Mountains near the edge of the watershed. The Mount Lemmon facility actually discharges into the Lower San Pedro watershed, even though the treatment facility itself is located within the Rillito watershed. Three WQARF sites are in this watershed: Camino del Cerro, Shannon Road – Rillito Creek, and Broadway North. Nonpoint source issues include urban runoff, irrigated agriculture and grazing. In addition, recent wildfires in the Santa Catalina Mountains have led to increased sediment loads in some drainages. Eleven closed landfills are within the watershed. The active, privately owned Speedway Landfill is also in this watershed. The closed landfills are:

- La Cholla #1 and #2
- Cactus
- Columbus
- Walnut
- Vincent Mullins
- Broadway North
- Broadway South
- Prudence
- Harrison
- Irvington

The Rillito watershed is very important to water resource planning in the Tucson area. The watershed drains the Santa Catalina Mountains, Rincon Mountains, Santa Rita Mountains and Whetstone Mountains, and it provides a significant part of the natural groundwater recharge for

the Tucson basin. It is a significant tributary watershed for the Upper and Lower Santa Cruz watersheds. The Rillito includes a large number of municipal supply wells serving the Tucson metropolitan area, and it has the largest number of perennial streams of any watershed in the PAG planning area, including: Cienega Creek (a Unique Water), Davidson Canyon (nominated for Unique Water status), Empire Gulch, Cinco Canyon, Mattie Canyon, Wakefield Canyon, Posta Quemada Wash, Upper Tanque Verde Creek, Sabino Creek, Lemmon Creek and others. Cienega Creek is a particularly prominent feature in the watershed. The upper perennial reach is the focal point of the Las Cienegas National Conservation Area. The lower perennial reach is in Pima County's Cienega Creek Natural Preserve. Sabino Canyon is a very popular recreation area in the Coronado National Forest.

Lakeside Lake is the only impaired waterbody in this watershed. It is an artificial urban lake on Tucson's east side. A popular fishing spot, the lake is sustained by reclaimed water and stormwater runoff. Several fish kills have occurred at the lake, and ADEQ has prepared a draft TMDL addressing dissolved oxygen, pH and nutrients. The February 2005 draft of the TMDL document (ADEQ with PBS&J, 2005) calls for addition of alum to the lake to correct the problems. The City of Tucson also has installed an aeration system.

8.4.3.1 Monitoring

ADEQ, PAG and other entities monitor the Rillito watershed extensively. ADEQ's 2004 305(b) report includes surface water quality monitoring results for Chiminea Creek, Cienega Creek, Loma Verde Wash, Madrona Creek, Sabino Canyon, Lakeside Lake and Rose Canyon Lake. PAG has conducted additional surface water quality monitoring in Davidson Canyon, Cienega Creek and Posta Quemada Wash. Tucson Water and other water providers monitor wells throughout the watershed. The City of Tucson and Pima County monitor stormwater quality for their municipal stormwater discharge permits. Groundwater at WQARF sites and other landfills is monitored regularly, as is Lakeside Lake. Surface water quality and groundwater quality monitoring at wastewater treatment facilities occurs in accordance with the facilities' permits.

8.4.3.2 Education and Public Information

Outreach in the Rillito watershed occurs together with the outreach for the Upper Santa Cruz watershed. PAG's and local agencies' committees, libraries and Web sites address education and information needs for both watersheds. The stormwater pollution prevention educational campaigns target both watersheds too. In addition to these activities, PAG is very active in the Cienega Corridor Conservation Council and somewhat active in the Sonoita Valley Planning Partnership. These organizations help disseminate information on the Lower and Upper Cienega Creek watersheds, respectively.

8.4.4 Lower Santa Cruz

Only a relatively small part of the Lower Santa Cruz watershed (Figure 8-6) is within PAG's planning area. However, PAG's part of the watershed includes three wastewater treatment facilities:

- Marana
- Rillito Vista
- Adonis

One perennial stream – Wild Burro Canyon in the Tortolita Mountains – is also within PAG's portion of the Lower Santa Cruz watershed. No Unique Waters or impaired waters are in the area. Two closed landfills (Marana #1 and Marana #2) and the active Tangerine Road landfill are in the area.

Figure 8-5. Rillito Watershed in Pima County

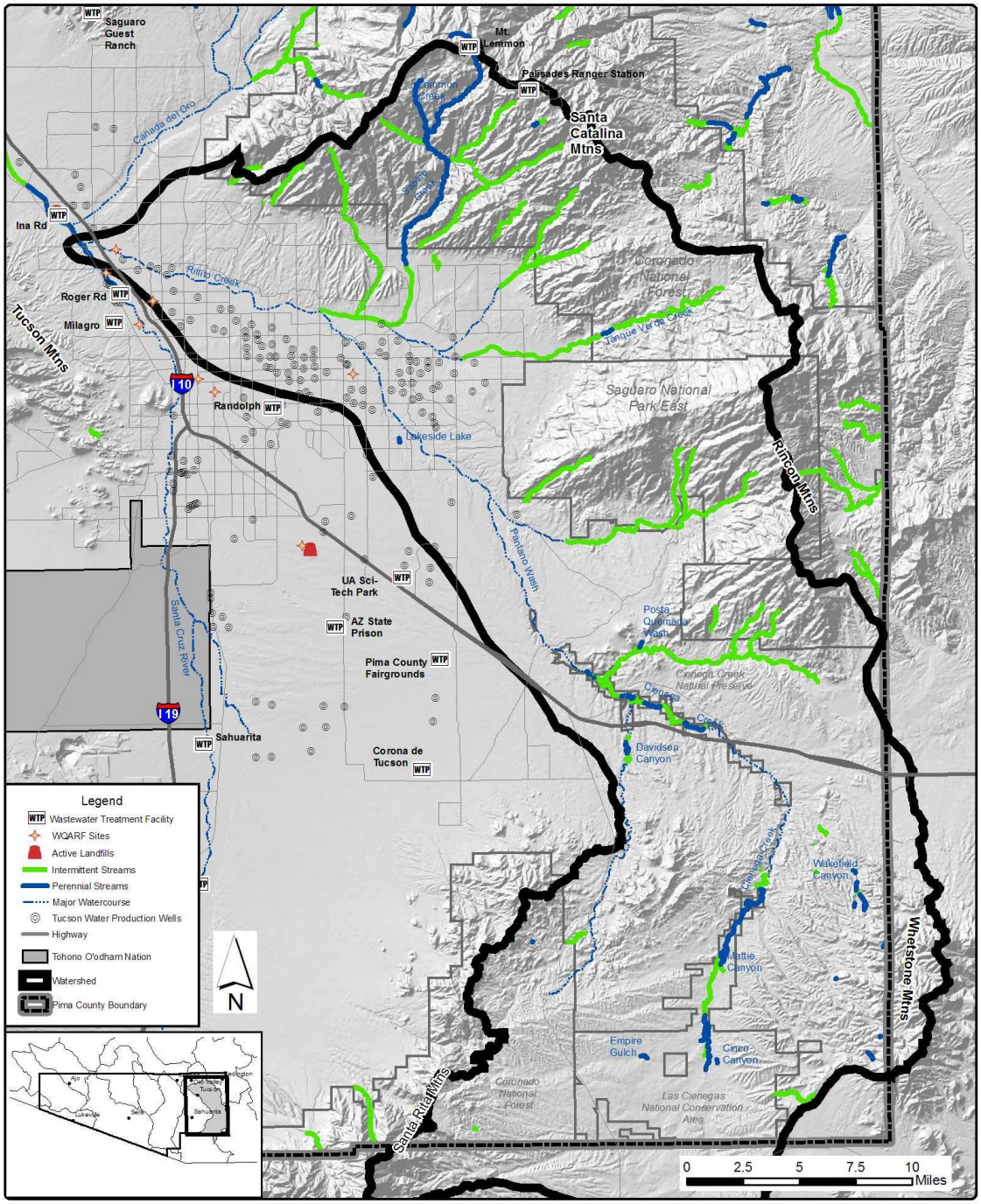
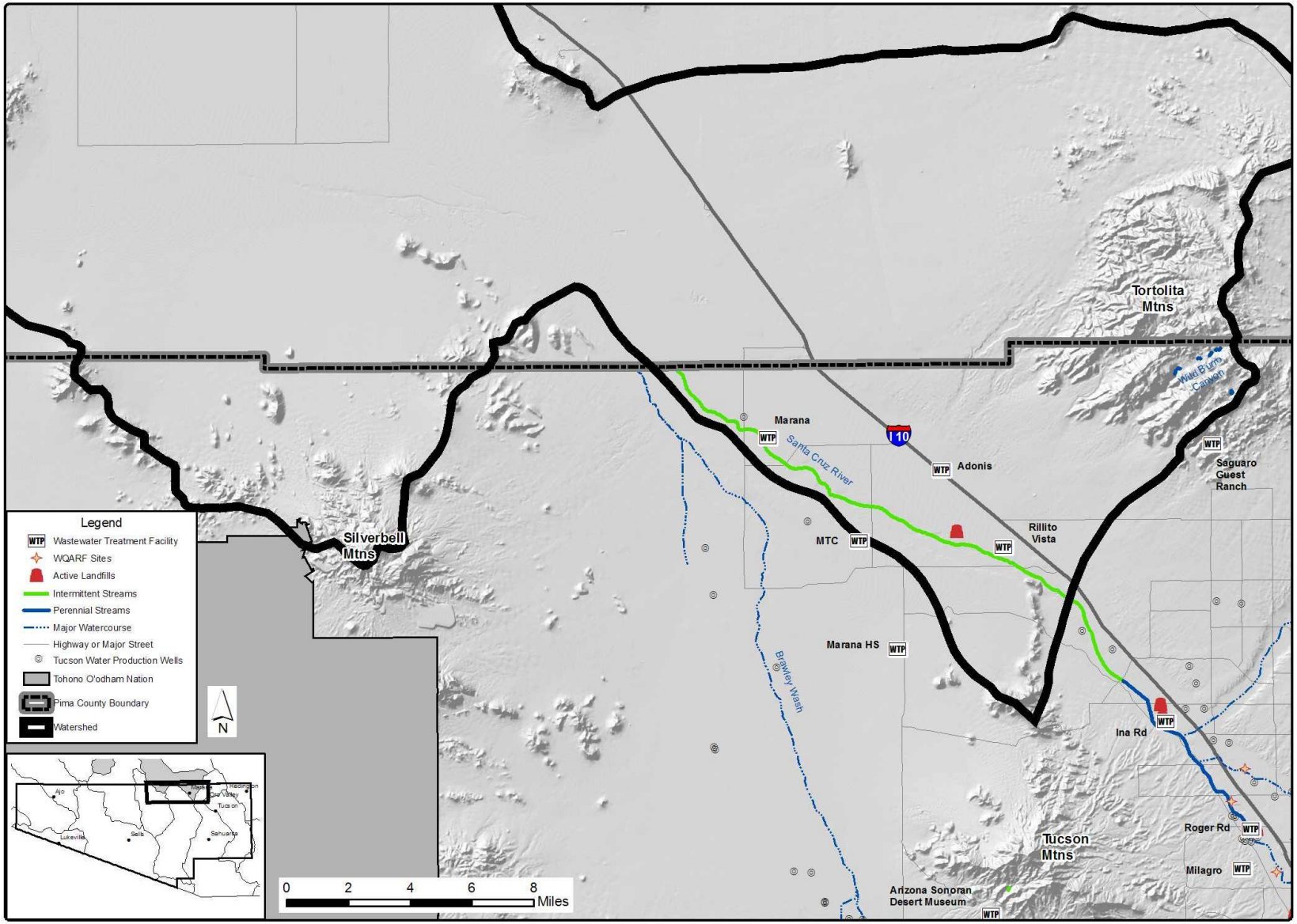


Figure 8-6. Lower Santa Cruz Watershed in Pima County



8.4.4.1 Monitoring

In PAG's part of the Lower Santa Cruz watershed, the effluent dependent reach of the Lower Santa Cruz is monitored regularly. Local water providers monitor groundwater quality from their wells in accordance with the Safe Drinking Water Act. Water quality monitoring at wastewater treatment facilities occurs in accordance with the facilities' permits.

8.4.4.2 Education and Public Information

Education and dissemination of public information for this area occurs in conjunction with activities in the Upper Santa Cruz and Rillito watersheds (see above for more details).

8.4.5 Brawley Wash

The Brawley Wash watershed (Figure 8-7) is almost entirely within Pima County, encompassing the Altar and Avra Valleys west of Tucson. It is a rural watershed, separated from Tucson by the Tucson Mountains. However, parts of metropolitan Tucson are beginning to extend into it.

Brawley Wash is a very important watershed from a water resource standpoint. It includes Tucson Water's Avra Valley well fields, which contribute significantly to the Tucson area's water supply. It is also the location of the Central Avra Valley Storage and Recovery Project (CAVSARP), which is the largest CAP water recharge and recovery facility in the region. Artificial groundwater recharge and recovery in Avra Valley is expected to be a major component of Tucson's water resource plans for many years into the future.

Four wastewater treatment facilities are in the Brawley Wash watershed. Pima County operates the Avra Valley WWTF in southern Avra Valley. The Arizona-Sonora Desert Museum has its own wastewater treatment facility in the Tucson Mountains. The Marana High School and the MTC correctional facility are served by small package plants.

Potential nonpoint sources of pollutants include grazing, mines and irrigated agriculture. Two closed landfills (Ryan and County Parks #2) are also present in the watershed.

Arivaca Lake, at the southeast periphery of the watershed, is an impaired water. ADEQ has completed a TMDL for the lake, which was listed due to the presence of mercury in fish tissue at concentrations in excess of guidelines. There are no permitted point source discharges of mercury in the Arivaca Lake watershed, nor were any other significant terrestrial sources identified despite an intense search conducted for the TMDL study. The TMDL study concluded that background watershed loading is the major source of mercury to the lake. Implementation plans focus on livestock and range best management practices to reduce erosion rates (ADEQ et al., 1999).

Brawley Wash, the principal drainage feature in the watershed, is ephemeral. However, Arivaca Lake and Arivaca Creek are perennial. There are no Unique Waters in the watershed.

8.4.5.1 Monitoring

Surface water monitoring in this watershed is limited, due to the paucity of surface water sources. ADEQ's 2004 305(b) report contains monitoring results for Arivaca Lake but no other waterbodies in this watershed. A recent inventory of available water quality data for priority streams in Pima County (PAG, 2002b) contained ADEQ sampling data from 1993 for Arivaca Creek.

Groundwater monitoring is more extensive. Tucson Water and other water providers have wells that are monitored in accordance with the Safe Drinking Water Act.

8.4.5.2 Education and Public Information

Education and dissemination of public information for this area occurs in conjunction with activities in the Upper Santa Cruz and Rillito watersheds (see above for more details). PAG has also coordinated with the Arivaca Water Education Task Force (AWET).

8.4.6 Tenmile Wash

A portion of the Tenmile Wash watershed (Figure 8-8) is in arid northwest Pima County. It includes the unincorporated communities of Ajo and Childs. The Ajo Improvement Company WWTF is in this watershed. No perennial streams, Unique Waters or impaired waters are present. Potential nonpoint sources of pollutants include mining and grazing. The active Ajo Landfill is also within this watershed.

8.4.6.1 Monitoring

Surface water monitoring in PAG's part of the Tenmile Wash watershed is extremely limited, due to the lack of perennial water. Water quality monitoring at the WWTF and mines presumably occurs in accordance with applicable permits and regulations. Water providers conduct groundwater quality monitoring under the Safe Drinking Water Act.

8.4.6.2 Education and Public Information

Education and public information in and about PAG's portion of this watershed are limited. PAG's activities have been limited to conducting a public hearing for a 208 Plan Amendment regarding the Ajo Improvement Company WWTF and maintaining a document library that contains some information pertinent to the watershed.

8.4.7 Rio Sonoyta

The Rio Sonoyta watershed (Figure 8-9) is in extreme southwestern Pima County along the Mexico border. It includes one of the few natural, perennial waterbodies in western Pima County – Quitobaquito Springs (along with the pond that the springs support). This watershed also includes wastewater treatment facilities at the Lukeville border station and Organ Pipe Cactus National Monument. On the U. S. side of the border, the watershed consists almost entirely of federal lands: Organ Pipe Cactus National Monument, Cabeza Prieta National Wildlife Refuge and the Barry M. Goldwater Air Force Range.

8.4.9.1 Monitoring

Surface water monitoring occurs at Quitobaquito Springs and Quitobaquito Pond. Otherwise, water quality monitoring is very limited due to the arid nature of the watershed and the limited development of water resources.

8.4.9.2 Education and Public Information

PAG does not conduct any educational or public information activities in this watershed.

Table 8-1. Features of the Watersheds in PAG's Designated Planning Area

Watershed	*Perennial Waterbodies*	*Impaired Waters*	*TMDLs*	*WWTFs in watershed*	*Regional WWTFs serving watershed*	*Active Public Landfills in Watershed*	*Population** 2005 / 2030*
Aguirre Valley 15050305	None	None	None	None	None	None	(a)
Brawley Wash 15050304	Arivaca Lake, Arivaca Creek (approx. 2.7 miles plus lake area)	Arivaca Lake	Arivaca Lake	Arizona-Sonora Desert Museum, Avra Valley, Marana High School, MTC	Avra Valley	None	7,191 / 84,112
Lower San Pedro 15050203	Bingham Cienega, Buehman Canyon*, Bullock Canyon, Edgar Canyon, Espiritu Canyon, San Pedro River, Youtcy Canyon (approx. 13.1 miles)	None	None	Mt. Lemmon spray field	None	None	152 / 245
Lower Santa Cruz 15050303	Wild Burro Canyon (approx. 0.4 miles)	None	None	Adonis, Marana, Rillito Vista	Marana	Tangerine	14,042 / 60,772

Watershed	*Perennial Waterbodies*	*Impaired Waters*	*TMDLs*	*WWTFs in watershed*	*Regional WWTFs serving watershed*	*Active Public Landfills in Watershed*	*Population** 2005 / 2030*
Rillito 15050302	Apache Spring, Cienega Creek*, Cinco Canyon, Davidson Canyon, Empire Gulch, Lakeside Lake, Lemmon Creek, Little Nogales Spring, Mattie Canyon, Montosa Canyon, Nogales Spring, Posta Quemada, Rose Canyon Lake, Sabino Creek, Scholefield Spring, Simpson Spring, Tanque Verde (upper), Wakefield Canyon, Wild Cow Spring (approx. 35 miles plus lake area)	Lakeside Lake	Lakeside Lake (draft)	Mount Lemmon, Palisades Ranger Station	Ina Road, Mount Lemmon, Roger Road	None	408,851 / 566,563
Rio De La Concepcion 15080200	None	None	None	None	None	None	(a)
Rio Sonoyta 15080102	Quitobaquito Springs, Quitobaquito Pond (approx. 0.1 miles plus pond area)	None	None	Lukeville, Organ Pipe Cactus National Monument	None	None	(a)
San Cristobal Wash 15070203	None	None	None	None	None	None	(a)
San Simon Wash 15080101	None	None	None	None	None	None	(a)
Santa Rosa Wash 15050306	None	None	None	None	None	None	(a)

Watershed	*Perennial Waterbodies*	*Impaired Waters*	*TMDLs*	*WWTFs in watershed*	*Regional WWTFs serving watershed*	*Active Public Landfills in Watershed*	*Population** 2005 / 2030*
Tenmile Wash 15070202	None	None	None	Ajo	Ajo	Ajo	(a)
Tule Desert 15080103	None	None	None	None	None	None	(a)
Upper San Pedro 15050202	None	None	None	None	None	None	40 / 57
Upper Santa Cruz 15050301	Upper Canada del Oro, Honey Bee Canyon, Romero Canyon, Ruelas Canyon, Santa Cruz River (edw) (approx. 11.7 miles)	None	None	Arivaca Junction, AZ State Prison, Corona de Tucson, Green Valley, Ina Rd., Milagro, Mt. Lemmon, Pima County Fairgrounds, Randolph, Roger Rd., Sahuarita, Sahuarita High School, UA Science/Tech Park	Corona de Tucson, Green Valley, Ina Road, Roger Road, Sahuarita	Los Reales, Sahuarita #2	443,656 / 783,825

* = Unique Water

**Population calculated using TAZ data and area weighting method (assumes equal distribution of population across TAZ.); TAZ data set does not completely cover Brawley watershed. Population was only estimated for the portion of the watershed within Pima County.

(a) Data not available for watersheds in western Pima County. Estimated population for total of all watersheds west of Brawley: 11, 655 (2005) / 19,497 (2030).

Figure 8-7. Brawley Wash Watershed in Pima County

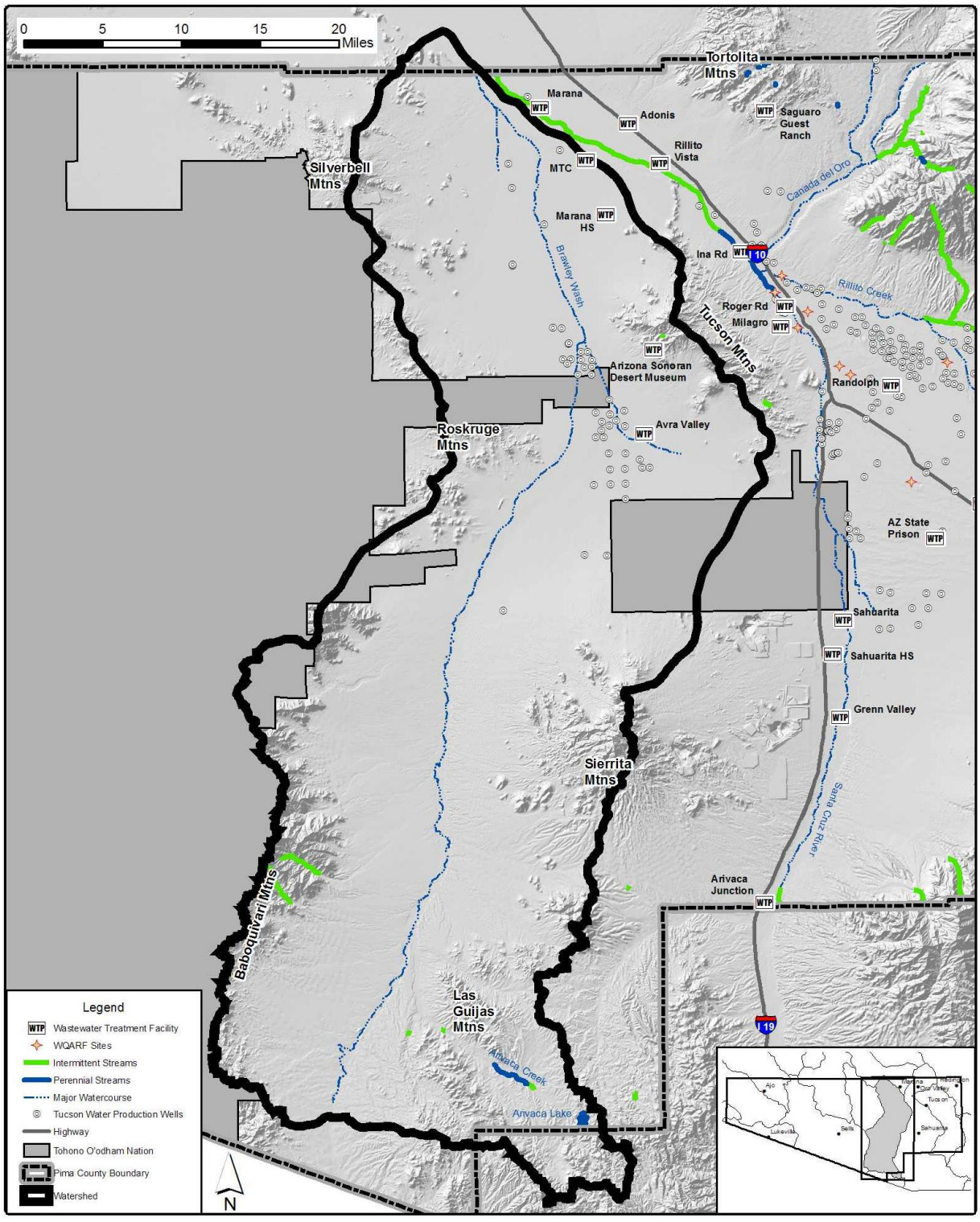


Figure 8-8. Tenmile Wash Watershed in Pima County

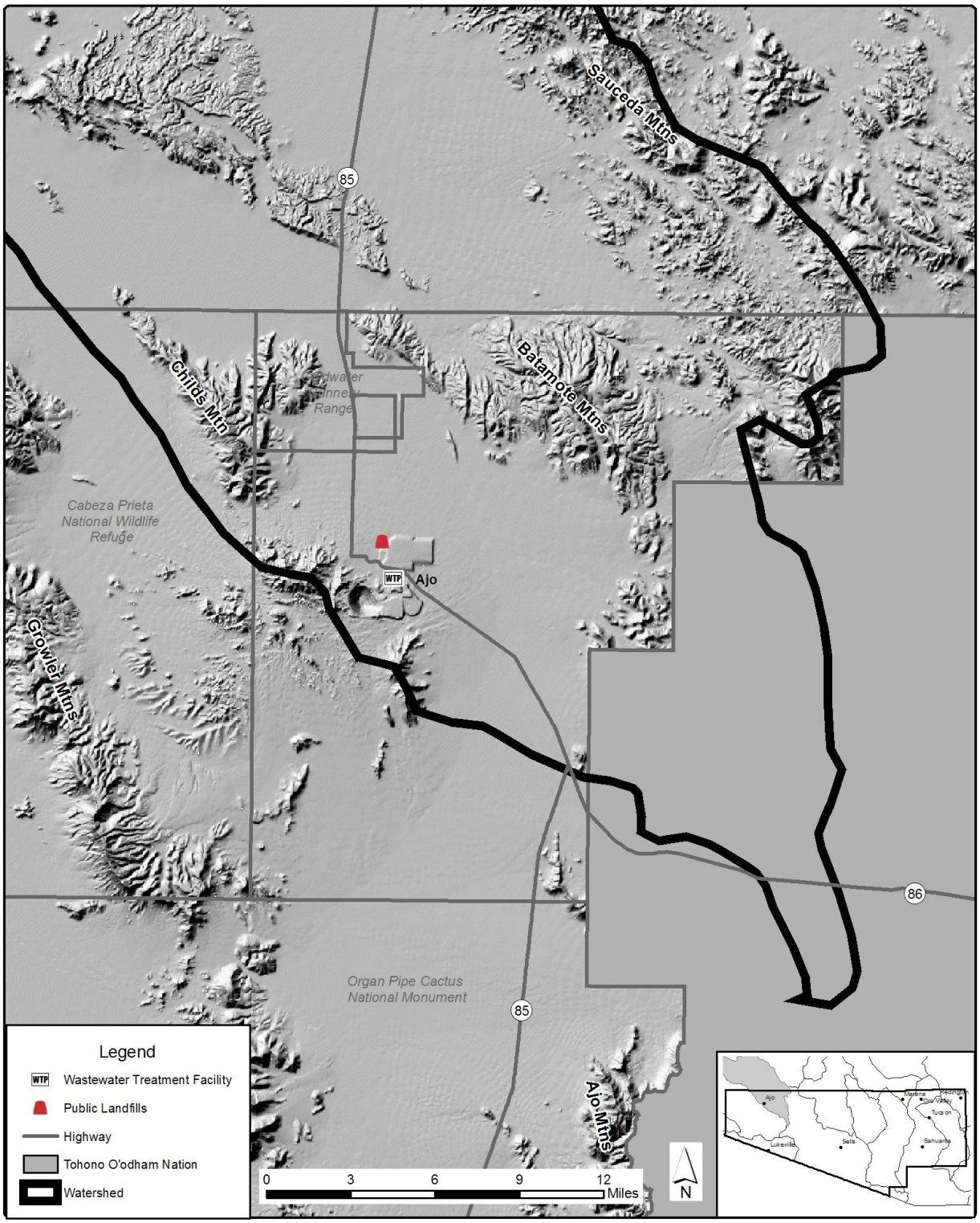
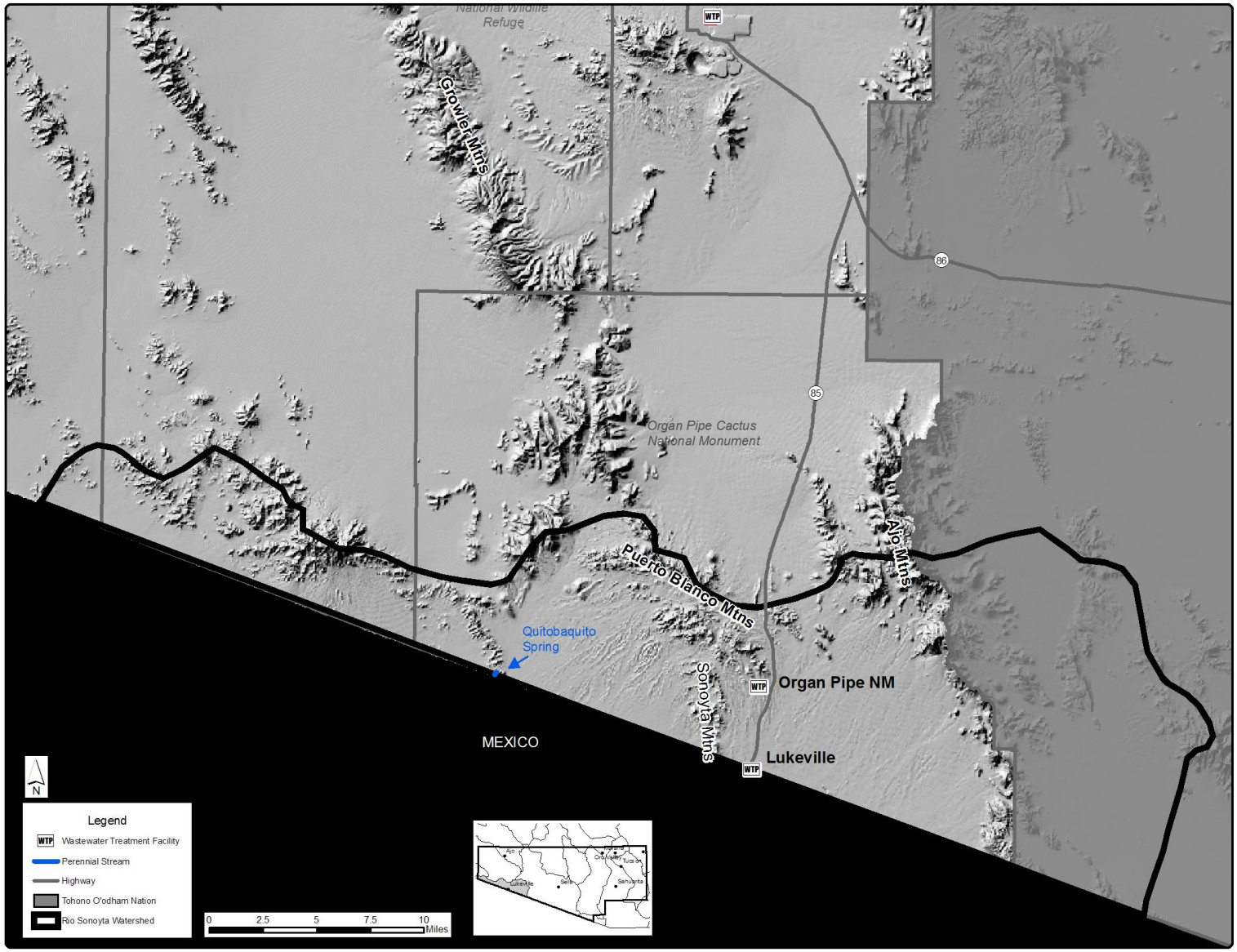


Figure 8-9. Rio Sonoyta Watershed in Pima County



9. PLAN DESCRIPTION AND POLICIES

9.1 DEFINITIONS

Policies in PAG's 208 Plan refer to a number of key terms. These are defined below.

Wastewater Treatment Facility: A facility requiring an individual Aquifer Protection Permit or NPDES permit for the treatment and disposal of wastes from toilets, baths, sinks, lavatories, laundries, and other plumbing fixtures, in places of human habitation, employment, or recreation. On-site wastewater treatment systems (e.g., septic tanks) are not included in this definition.

Private Wastewater Treatment Facility: A wastewater treatment facility owned by an entity that is not a Designated Management Agency.

Public Wastewater Treatment Facility: A wastewater treatment facility owned by a Designated Management Agency.

Wastewater Reclamation Facility (or "Water" Reclamation Facility): A wastewater treatment facility that is constructed for the purpose of generating reclaimed wastewater for reuse.

Small Wastewater Treatment Facility: A wastewater treatment facility with a planned capacity less than 5 MGD. Small wastewater treatment facilities typically serve an individual subdivision, mobile home development, commercial facility, park, prison, school or other specific area that is not contiguous with the regional wastewater treatment and conveyance network.

Large Wastewater Treatment Facility: A wastewater treatment facility with an existing or planned capacity greater than or equal to 5 MGD. Large wastewater treatment facilities include regional facilities and sub-regional facilities.

Regional Wastewater Treatment Facility: A public wastewater treatment facility or public wastewater reclamation facility with an existing or planned service area that encompasses: (1) multiple jurisdictions; or (2) the majority of the incorporated area of a single city or town; or (3) the majority of an urbanized unincorporated area.

Sub-Regional Facility: A public wastewater treatment facility or public wastewater reclamation facility serving an area that could otherwise be served by a regional facility but is not because: (1) service by a regional facility, while technically feasible, is impractical or uneconomical due to the conveyance distance and/or gradient constraints; and (2) the entity entitled to reuse the effluent wishes to facilitate the treatment and delivery of reclaimed water to the regional reclaimed water system at a location that lessens the conveyance costs of the reclaimed water.

9.2. REGIONALIZATION

It is PAG 208 Planning policy to treat sewage in regional and sub-regional, publicly owned wastewater treatment facilities, and to avoid a proliferation of small, privately owned facilities. This policy will be implemented by requiring 208 Plan Amendments before small, privately owned wastewater treatment facilities can be constructed or receive discharge permits.

The reason for the regionalization policy, as explained in the 1985 Areawide Point Source Update (Greeley and Hansen, 1985), is that various negative impacts may result if a number of small private wastewater treatment plants are constructed. The following considerations were noted in the 1985 Point Source Update with regard to small, private plants:

- difficulty in sewering adjacent privately-owned properties
- reliability of small wastewater treatment plants
- problems that industrial wastes and sludge disposal create for small plants
- potential degradation of groundwater
- invalidation of regional plans.

In addition, as noted in the first chapter of this report, a proliferation of small facilities could place a strain on resources for inspection and enforcement, and it could result in water quality management in the region becoming the responsibility of numerous entities having varying levels of experience with local conditions. Also, if a waterbody were to become impaired, the presence of numerous discharges to that waterbody would complicate efforts to improve water quality and prepare a TMDL. Increased competition among local entities for federal loans and grants could also occur with an increase in the number of wastewater treatment facilities in the region.

9.3. PRIVATE WASTEWATER TREATMENT FACILITIES

The PAG 208 Plan discourages private wastewater treatment facilities. All private facilities are considered to be inconsistent with the 208 Plan unless specified otherwise in the 208 Plan or in an approved 208 Plan Amendment.

In rare cases, a very small, isolated private wastewater treatment facility could be deemed “not inconsistent” with PAG’s 208 Plan under the following conditions:

- no sewer service from the Designated Management Agency will likely be available within 10 years, and the Designated Management Agency declines (in writing) to provide service to the area that the private facility would serve;
- there are adequate assurances that the facility will connect to the public conveyance and treatment system at such time that service by a Designated Management Agency becomes available (the DMA will determine what is required to demonstrate “adequate assurance”);
- the facility owner and operator demonstrate, to the satisfaction of ADEQ, PDEQ, the DMA, the water provider and the local jurisdiction where the facility would be located, the financial and technical capability to operate the facility for the entire time that the facility will be needed;
- there will be no discharge to any waters of the United States;
- the facility will not exceed 0.02 MGD capacity;
- the facility will not receive any commercial or industrial waste;
- neither the facility nor the conveyance lines to the facility will interfere with future plans for regional sewer service to the area or to adjacent or upstream areas;
- the facility will not interfere with water providers’ plans for providing water or reclaimed water to the site or to surrounding areas;

- the jurisdiction in which the facility will be located supports the construction of the facility, and none of the other PAG member jurisdictions objects to the facility's construction;
- the water provider whose service area includes the proposed facility location does not object to construction of the facility;
- it is demonstrated that the facility will not cause any water quality or odor impacts to surrounding areas; and
- all property owners within ½ mile of the proposed facility location are notified of the proposal, and none of the property owners within ½ mile object to the proposal within 30 days of being notified.

9.4. POLICY ON FACILITIES CONSTRUCTED DESPITE LACK OF CONFORMANCE WITH 208 PLAN

PAG's policy on facilities constructed despite lack of conformance with the 208 Plan is that they should be connected to the regional wastewater treatment system and that the areas served by these facilities should be served by the Designated Management Agency with a facility that conforms with the Plan. Any expansion of the non-conforming facilities would be inconsistent with the 208 Plan. Issuance of new permits, modified permits, or permit renewals for non-conforming facilities would be inconsistent with the 208 Plan.

9.5. AZPDES PERMITS FOR INDUSTRIAL FACILITIES

Surface water discharges of industrial wastewater requiring AZPDES permits are inconsistent with the PAG 208 Plan unless otherwise specified in the 208 Plan or in an approved 208 Plan Amendment. Industrial stormwater discharges that are in compliance with EPA's MSGP or that are addressed by the AZPDES municipal stormwater permits are consistent with the PAG 208 Plan.

9.6. AZPDES PERMITS FOR OTHER ACTIVITIES

9.6.1. Municipal stormwater discharges

PAG's 208 Plan recognizes the importance of maintaining stormwater quality and reducing non-point source pollution as part of a comprehensive water quality management plan. PAG works with local municipalities to develop and coordinate regional public outreach and education programs on stormwater pollution prevention, and to help local governments coordinate on various stormwater permitting issues as they arise. Issuance of AZPDES permits to municipalities for stormwater discharges will generally be consistent with the 208 Plan.

9.6.2. Groundwater remediation projects

PAG's 208 Plan encourages the remediation and beneficial use of contaminated groundwater. In the event that a groundwater remediation project requires an AZPDES discharge of the treated water, issuance of the permit would, under most circumstances, be consistent with the 208 Plan provided that no local jurisdiction potentially affected by the discharge objects.

9.6.3. Reclaimed water projects

Expansion of the regional reclaimed water system is encouraged by the PAG 208 Plan. Additional treatment of this water, expansion of facilities, and increased use of reclaimed water,

such as the plans proposed in the City of Tucson's draft *Water Plan 2000-2050* (including recharge of groundwater supplies), are all supported by the 208 Plan.

9.6.4. Riparian restoration projects

PAG's 208 Planning policy on riparian restoration projects is that projects requiring an AZPDES permit for the use of reclaimed water to restore or enhance riparian vegetation along ephemeral or effluent-dependent washes will generally be consistent with the 208 Plan, provided that the project does not conflict with other local or regional plans or intergovernmental agreements.

9.6.5. DeMinimis discharges

Discharges authorized by the AZPDES DeMinimis Discharge General Permit are typically not inconsistent with the PAG 208 Plan.

9.7. ON-SITE SYSTEMS

On-site domestic wastewater treatment systems (e.g., septic tanks) are one of several accepted ways of managing water quality in Pima County. However, installation and use of on-site systems where connection to a Designated Management Agency's wastewater conveyance system is technically and economically feasible would be inconsistent with the 208 Plan. Existing subdivisions relying on septic tanks for wastewater treatment are encouraged to connect to the Designated Management Agency's conveyance and treatment system when it becomes accessible.

9.8. CONVERSION OF SEPTIC SYSTEMS TO ON-SITE WASTEWATER TREATMENT FACILITIES

Some public facilities such as schools and parks use septic tanks to treat wastewater because sewer service is not available. Proposals to change the wastewater service for these facilities from a septic tank to an on-site wastewater treatment facility will normally require a 208 Plan Amendment. However, such a conversion could be deemed consistent with the 208 Plan provided that it represents a net environmental benefit, the local jurisdiction does not object, and the facility does not serve any off-site areas. In addition, the facility would be expected to connect to the Designated Management Agency's conveyance and treatment system as soon as service becomes available.

9.9. PRIORITY WATERBODIES

Table 9-1 is a list of the highest priority streams in Pima County for water quality and quantity monitoring, management and restoration. The streams were selected by PAG and Pima County staff as part of the water quality element of the Pima County Comprehensive Plan and the Pima County Sonoran Desert Conservation Plan. Stream selection was based primarily on the presence of perennial or intermittent stream flow, the area of riparian habitat, the presence of historic or existing populations of native fish and frog species, and location with respect to other surface water sources and possible wildlife corridors. The potential threat to any individual stream or the fact that an individual stream might already be monitored or protected was not considered when developing the list. Some streams did not have as high habitat value as others but were included because they were considered to be a priority by the Bureau of Land Management, U.S. FWS, PAG, Arizona Game and Fish Department (AGFD), or County personnel. Pima County's Sonoran Desert Conservation Plan Riparian Element report, especially Appendix A1 – Table 1, and the historic occurrence of native fish were used to

determine the resources present in and around each stream. Priority stream locations are shown on Figure 9-1. Unique waters, as identified and regulated under the state, have stricter water quality standards, which must be met to be consistent with the 208 plan

In recognition of the resource value of the waterbodies listed in Table 9-1, PAG's 208 Plan strongly discourages the discharge of pollutants to these waterbodies. Issuance of AZPDES permits for commercial, industrial or domestic wastewater facility discharges to the priority waterbodies would be inconsistent with the 208 Plan. Future 208 Plan Amendments that would allow such discharges are discouraged but not prohibited if consistent with state surface water quality standards. However, efforts to restore floodplain aquifers or reestablish flow or degraded riparian vegetation would require special consideration to determine if there are net biological benefits.

Table 9-1. Priority Waterbodies in Pima County

Agua Caliente Canyon	Espiritu Canyon
Agua Verde Creek	Florida Canyon
Arivaca Creek	Mattie Canyon
Bingham Cienega	Quitobaquito Spring
Buehman Canyon	Rincon Creek
Canada del Oro (upper)	Sabino Canyon (upper and lower)
Cienega Creek (upper and lower)	San Pedro River
Davidson Canyon	Tanque Verde Creek (upper)
Empire Gulch	Wakefield Canyon/Nogales Spring

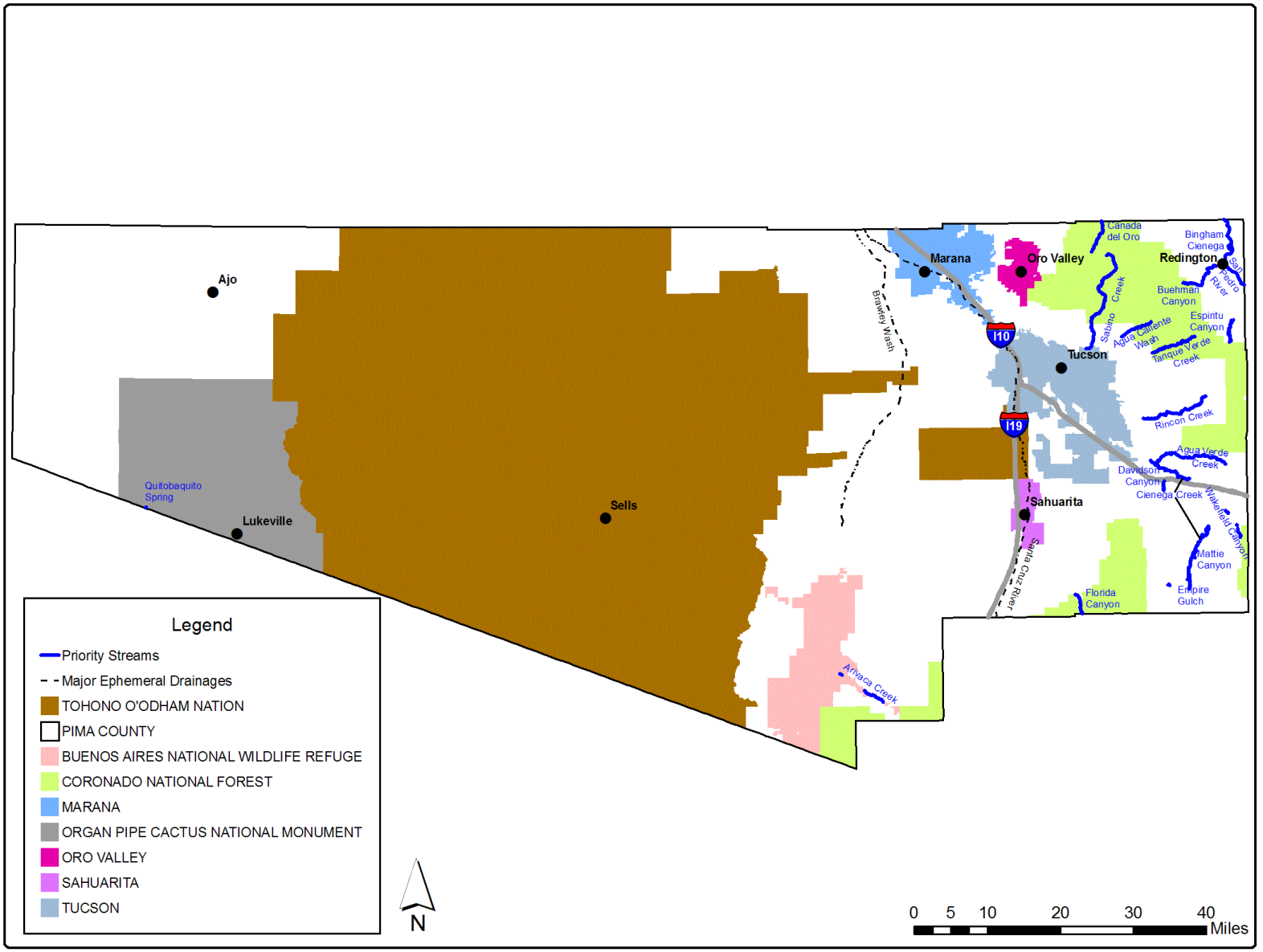
9.10. REUSE OF WASTEWATER

The importance of treated wastewater as a water resource in the region has been acknowledged by PAG's 208 Plan for 25 years or more. As noted in Chapter 2, a policy stating that "wastewater reuse should be used as a disposal alternative wherever possible" was adopted in 1980, and the following policies were adopted in 1985:

- The practice of effluent reuse is strongly endorsed by the PAG Regional Council and its member jurisdictions
- Planning for wastewater treatment and effluent reuse treatment facilities will be done jointly by Pima County, the City of Tucson and local jurisdictions and will require Regional Council approval
- Private developments desiring effluent for use within a proposed project are encouraged to utilize effluent supplied by the City of Tucson via the Metropolitan Effluent Delivery System.

PAG will continue to rely on these policies when conducting wastewater treatment facility planning and when reviewing proposed 208 Plan Amendments for new or expanded wastewater treatment facilities. It is noted, however, with regard to the third policy listed above, that the City of Tucson will no longer be the only municipality with an effluent delivery system, and that utilization of effluent from other municipalities' effluent delivery systems is also encouraged. PAG will also continue to help the local jurisdictions and water providers holding rights to treated wastewater work together on plans for wastewater reclamation facilities.

Figure 9-1. Priority Streams in Pima County



10. PLAN IMPLEMENTATION AND PROCEDURES

PAG and the Designated Management Agencies implement the Areawide Water Quality Management Plan. Implementation consists primarily of constructing, operating, monitoring and maintaining new and expanded wastewater treatment facilities, conveyance systems, effluent reuse systems, and solid waste disposal systems. The construction, operation, monitoring and maintenance of the wastewater treatment, conveyance and reuse facilities and systems is the responsibility of the DMAs and of the water providers holding rights to effluent. Solid waste facilities are operated by public and private entities in accordance with regulations enforced by ADEQ. PAG, ADEQ and the local jurisdictions also implement the plan by following the policies and procedures established within this plan.

In addition, successful water quality management relies heavily on the implementation of a variety of regulatory and non-regulatory programs. These programs, which are implemented by ADEQ or by PDEQ through a delegation agreement, are discussed later in this chapter.

10.1. DESIGNATED MANAGEMENT AGENCIES

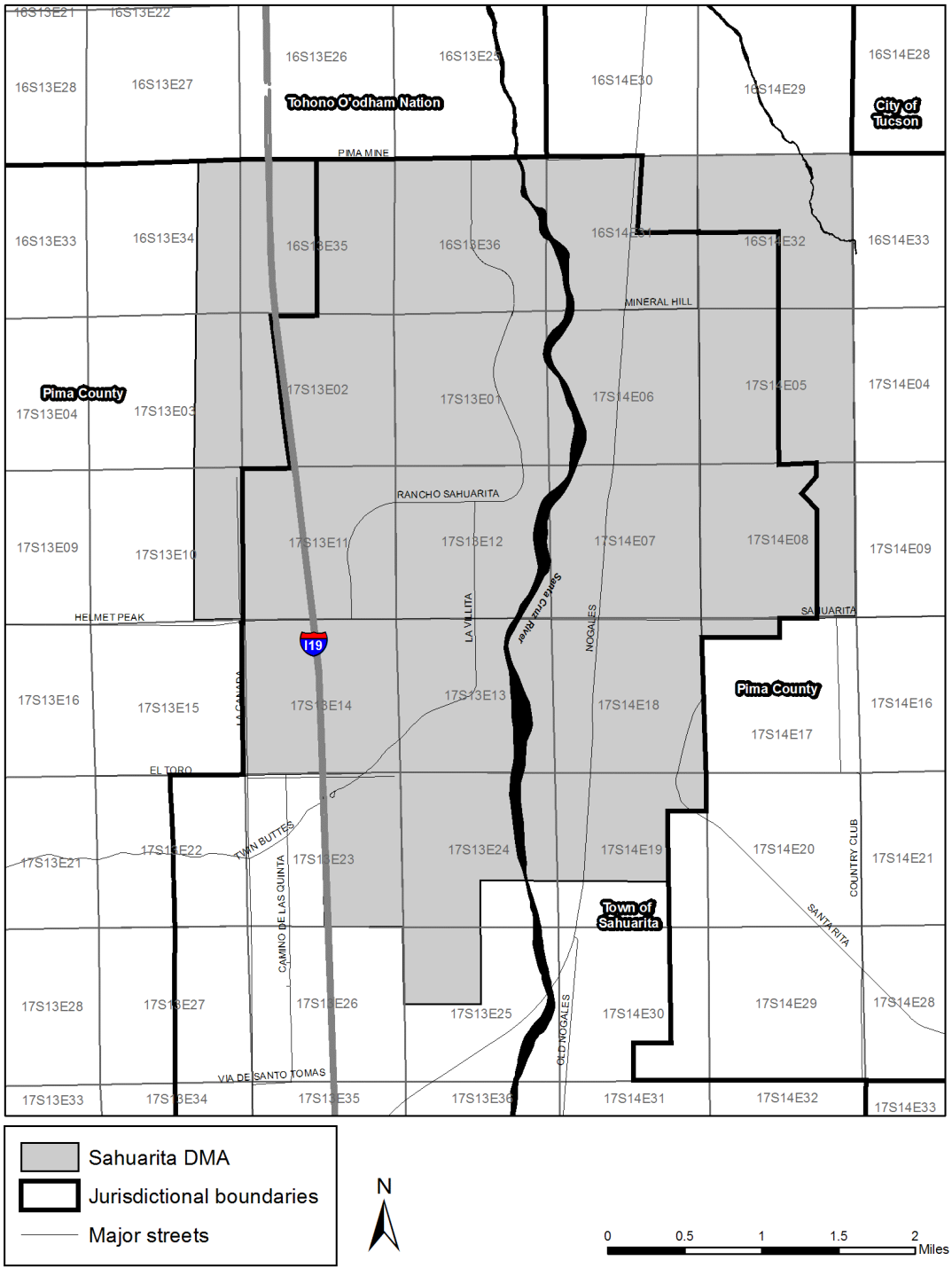
The Town of Sahuarita is the Designated Management Agency for areas shown on Figure 10-1. Pima County Wastewater Management Department is the Designated Management Agency for all remaining areas in Pima County, excluding tribal lands. At the request of adjacent counties and with the concurrence of any impacted local jurisdictions, Pima County may consider providing service to customers outside the Pima County limits to benefit the general health, environment and economy of these areas. As an example, Pima County Wastewater Management Department, at the request of Pinal County, currently provides service to an area north of the Pima/Pinal County line along Route 77, because service by Pima County is the most practical alternative in this area. Establishing additional Designated Management Agencies in the PAG region would require a 208 Plan Amendment, following procedures described later in this chapter.

In addition to the Designated Management Agencies, other entities play a key role in PAG's Section 208 water quality management planning program. In a 1985 Update to the 208 Plan, Pima County Wastewater and Tucson Water were assigned the role of performing technical review functions for 208 Plan Amendments. The 1985 Update also stated that "planning for wastewater treatment and effluent reuse treatment facilities will be done jointly by Pima County, the City of Tucson and local jurisdictions…" This type of planning is underway, particularly for the southeastern part of Tucson.

During the 20 years that have passed since these policies and procedures were established, the Town of Sahuarita has incorporated and become a DMA, and other public water providers and local jurisdictions in the region have secured rights to effluent. Therefore, since additional entities now have a significant stake in wastewater planning, PAG's 208 Planning Program will include all of its member jurisdictions and various local water interests in the planning process for wastewater treatment and effluent reuse facilities through their membership in PAG's Watershed Planning Subcommittee. The Watershed Planning Subcommittee will review all proposed 208 Plan Amendments and fill the key technical review and advisory role in wastewater treatment and reclamation facility planning for the region. In addition, member jurisdictions and potentially affected water providers may be included in the Scope of Work Task

Forces that are convened to conduct initial coordination and review of proposed 208 Plan Amendments.

Figure 10-1. Town of Sahuarita Designated Management Area



10.2. CONSTRUCTION PRIORITIES AND TIMELINES

This 208 Plan Update does not call for the construction of new wastewater treatment facilities in the immediate future. However, several outlying facilities are nearing capacity, and therefore expansion of these facilities should be considered a priority. Facilities to be expanded in the near future include Corona de Tucson, Avra Valley, Marana and Sahuarita. Pima County's Facility Plan Update indicates that expansions at Marana, Avra Valley and Corona de Tucson are all included in the County's Capital Improvement Program for the years 2005 – 2010. Expansion of the Sahuarita WWTF is included in the Town of Sahuarita's Capital Improvement Plan for 2005-2009. Initiation and completion of the construction activities for these expansions is expected to occur between 2005 and 2010.

Beyond 2010, facility expansions are expected to occur roughly in accordance with the population and wastewater volume projections discussed in Chapter 7. However, it is possible of course that growth will occur either faster or slower than the current projections, or in different areas than what is currently expected. Therefore these projections are subject to change.

In addition to WWTF expansions, the County's Capital Improvement Program for 2005-2010 includes several conveyance projects, the Roger Road WWTP to Ina Road WPCF Interconnect, and odor control and rehabilitation at the Roger Road WWTP. The County has recently suggested that the viability of the Roger Road WWTP should be re-evaluated.

10.3. INTEGRATION OF WASTEWATER INFRASTRUCTURE PLANNING WITH OTHER REGIONAL PLANNING EFFORTS

PAG's 208 Plan recognizes that planning for wastewater infrastructure affects, and is affected by, other planning efforts in the region, such as transportation planning, land use planning and water resource planning. For that reason, it is PAG policy that economic development served by wastewater infrastructure, including new wastewater treatment facilities, should occur in planned growth areas, where there is access not only to the regional wastewater conveyance and treatment system, but also to renewable water supplies and adequate transportation facilities. This policy will help ensure that PAG's 208 Planning program will be consistent with other regional plans and local jurisdictions' land use plans, and it will help ensure that infrastructure will be developed efficiently.

In addition, the region is facing significant water resource challenges, and treated wastewater will become an increasingly important source of water to meet various water-supply needs. It is therefore essential that wastewater planning be integrated with water resource planning, so that treated wastewater will be a convenient and readily available renewable resource. An example of this type of integrated planning is the cooperative planning effort on Tucson's southeast side underway by Pima County and the City of Tucson.

In developing this update to the 208 Plan, PAG used the same population projections that have been used to develop Tucson Water's long-range water resource plan, Pima County Wastewater's Facility Plan Update, and PAG's Regional Transportation Plan. These population projections reflect each of the member jurisdictions' general and comprehensive land use plans, which were developed in accordance with Arizona's "Growing Smarter" legislation. The local governments' Growing Smarter plans include identification of growth areas and areas to be set aside as open space. In addition, Pima County's Sonoran Desert Conservation Plan identifies "biological core" areas, which are areas subject to policies and plans aimed at protecting sensitive and endangered species. The population projections for these open space areas and

biological core areas indicate overall lower population densities, and these in turn are reflected in lower future wastewater treatment facility capacities for the facilities serving the areas.

PAG will continue to coordinate its 208 planning and other watershed planning activities with regional transportation planning, water-resource planning, solid waste planning and land-use planning.

10.4. GROUNDWATER

Protection of groundwater quality from the disposal of pollutants on land or in subsurface excavations is a required element in 208 Plans [§208(b)(2)(K)], and it has been a principal goal of PAG's 208 Planning Program since its inception. In Arizona, the Aquifer Protection Permit program is the major regulatory program aimed at protecting groundwater quality. PAG's 208 Plan helps ensure the success of the APP program by limiting the proliferation of potential pollutant sources and thus minimizing the strain that numerous, poorly planned facilities would otherwise place on the monitoring and enforcement resources available for the APP program. The 208 and APP programs are linked by state rules that preclude the issuance of permits to wastewater treatment facilities that do not conform to 208 Plans (R18-9-A201B).

PAG will continue to ensure that wastewater treatment facilities are sited, planned and managed in a way that ensures protection of groundwater quality. PAG will also continue its role of working with local governments to inventory land uses and identify the potential impacts on groundwater quality of various land uses and potential pollution sources.

10.5. BIOSOLIDS

Pima County's Regional Biosolids Facility at the Ina Road Water Pollution Control Facility (WPCF) began operation in 1987. The treated biosolids produced by the facility are applied to agricultural fields. Future disposal options for biosolids might include continued application on agricultural fields, mine tailing reclamation, drying and pelletizing, and composting. Pima County is studying options for upgrading treatment processes to produce Class A pathogen-free biosolids. This would increase the options for reuse of the material. Pima County is also considering transferring all the solids handling facilities to the Ina Road WPCF in lieu of having facilities at both the Ina Road WPCF and the Roger Road WWTP (Pima County WWM, 2005d).

The Town of Sahuarita WWTP's biosolids are taken to the Tangerine Road Regional Landfill.

Disposal or use of biosolids by any of the above methods is consistent with the 208 Plan, provided that all applicable local, state and federal regulations are followed.

10.6. FINANCING OPTIONS

Pima County Wastewater Management Department is an enterprise fund of Pima County and does not depend upon property or sales taxes. The department's expenses are financed or recovered primarily through user charges. The principal sources of revenue are sewer user fees, sewer connection fees and grants. Pima County also issues sewer revenue bonds for the rehabilitation, construction, acquisition and improvement of the sanitary sewerage system, and obtains low-interest loans from the Arizona Water Infrastructure Finance Authority. The department's revenues first fund operation and maintenance of the system, then debt service, and finally the system development fund (Pima County WWM, 2004a).

The Town of Sahuarita has the authority to issue bonds, levy taxes and receive grants to finance construction, improvements and operation of its system. Sewer connection fees are used to finance phased expansions to the Sahuarita WWTP (Town of Sahuarita, 2005a).

When evaluating proposals for new wastewater treatment facilities, PAG will adhere to the following policies, established in the 1985 update to the 208 Plan, which relate to economics, financing and cost effectiveness:

- A permanent facility will only be constructed if it is functionally and environmentally sound and is the most cost-effective alternative (to the public) for relief of deficiencies of conveyance system capacity.
- Temporary treatment facilities are prohibited unless needed because of lack of planned service to the area and a temporary plant is the most environmentally and economically beneficial (to the public) way of providing wastewater treatment or effluent reuse.
- Private treatment plants are prohibited unless the private facility is the most cost-effective to the public in the long term.
- All wastewater treatment plants must be based on a cost-effective analysis that substantiates the plant as the most viable method of serving the area in both the long and short term. A financing method must be provided, including local user fees if applicable.
- All temporary plants must have a plan for transition to a permanent method of wastewater treatment, including financing arrangements that will not adversely affect the public. These arrangements must include payment of sewage connection fees.

10.7. FEDERAL, STATE AND LOCAL REGULATORY AND NON-REGULATORY WATER QUALITY PROTECTION PROGRAMS

10.7.1. Clean Water Act

The objective of the Clean Water Act is to restore and maintain the biological, chemical and physical integrity of the nation's waters. Two key provisions that affect areawide water quality management planning are the National Pollutant Discharge Elimination System (NPDES) program (known in Arizona as "AZPDES") and Total Maximum Daily Loads (TMDLs).

10.7.1.1. AZPDES

All facilities that discharge pollutants from any point source into waters of the United States are required to obtain or seek coverage under an AZPDES permit (ADEQ, 2005c). The permits address effluent limitations, monitoring requirements, reporting requirements, and other special conditions such as best management practices. Applications for new discharges must be made no later than 180 days before the discharge begins. Applications for permit renewals (for existing dischargers) must be made at least 180 days prior to the expiration of the existing permit. Facilities must be consistent with the appropriate 208 Plan in order to receive a permit.

In 1990, EPA issued regulations authorizing the creation of a NPDES permitting system for stormwater discharges from certain industrial activities. In 1999, EPA published rules that began Phase II of the stormwater program. Phase II expanded permit coverage to include small

municipalities and construction sites that disturb between one and five acres. In PAG's region, Tucson and Pima County were permitted under Phase I of the program. Oro Valley, Marana, South Tucson and other regulated entities submitted permit applications under Phase II of the program. PAG helps the local regulated jurisdictions coordinate various activities related to stormwater management. PAG is particularly active in conducting outreach and education activities that are required by the member jurisdictions' permits.

10.7.1.2. TMDLs

A Total Maximum Daily Load (TMDL) is the maximum daily amount of a pollutant that can be carried by a waterbody without causing an exceedance of a water quality standard. TMDLs are calculated for waterbodies included on the Section 303(d) list of impaired waters. A TMDL is the sum of the pollutant loads from natural sources, non-point sources and point-source discharges of the pollutant (ADEQ, 2005d).

TMDLs are one of the required elements that must be included in 208 Plans or referenced as part of the Plans. Only one TMDL, for a mercury problem at Arivaca Lake, has been completed in PAG's Designated Planning Area as of July 2005. The Arivaca Lake TMDL is hereby incorporated by reference into the 208 Plan. ADEQ also has prepared a draft TMDL for Lakeside Lake, an urban lake in Tucson, but it has not been approved and finalized.

10.7.2. Aquifer Protection Permit program

The Aquifer Protection Permit (APP) program is a state program designed to protect the water quality of Arizona's aquifers. An APP is needed for any facility that discharges a pollutant to an aquifer, or to the land surface or vadose zone in such a way that the pollutant might reach the aquifer. Facilities requiring APPs include (ADEQ, 2005e):

- Surface impoundments, pits, ponds, and lagoons
- Solid waste disposal facilities, except for mining overburden and wall rock that has not been subject to mine leaching operations
- Injection wells
- Land treatment facilities
- Facilities adding pollutants to a salt dome, salt beds, or salt formations, dry wells, underground caves, or mines
- Mine tailings piles and ponds
- Mine leaching operations
- Septic tank systems
- Underground water storage facilities (if wastewater-effluent is used)
- Point source discharges to navigable waters
- Sewage or wastewater treatment facilities

In the case of wastewater treatment facilities, ADEQ will not issue an APP unless the facility is consistent with the appropriate 208 Plan.

10.7.3. Regulations governing the reuse of effluent

Arizona has effluent reuse regulations that apply to the facility generating the wastewater that will be reused and to the site where the reclaimed water is used or applied. The facility providing the reclaimed water must have an individual APP indicating the class of reclaimed water it generates. The APP requires the facility to monitor the effluent quality to ensure that the effluent limitations for the particular reclaimed water class are met. ADEQ (2005f) provides the following discussion of reclaimed water standards and reclaimed water classes.

Reclaimed Water Quality Standards establishes five classes of reclaimed water expressed as a combination of minimum treatment requirements and a limited set of numeric reclaimed water quality criteria. Class A reclaimed water is required for reuse applications where there is a relatively high risk of human exposure to potential pathogens in the reclaimed water. For uses where the potential for human exposure is lower, Class B and Class C are acceptable.

The Reclaimed Water Quality Standards include two "+" categories of reclaimed water, Class A+ and Class B+. Both categories require treatment to produce reclaimed water with a total nitrogen concentration of less than 10 mg/l. These categories of reclaimed water will minimize concerns over nitrate contamination of groundwater beneath sites where reclaimed water is applied. As a result, the general permits for the direct reuse of Class A+ and Class B+ reclaimed water do not include nitrogen management as a condition of the reuse.

10.7.4. RCRA

According to EPA (2005), the goals of the Resource Conservation and Recovery Act (RCRA) are to:

- Protect us from the hazards of waste disposal;
- Conserve energy and natural resources by recycling and recovery;
- Reduce or eliminate waste; and
- Clean up waste, which may have spilled, leaked, or been improperly disposed.

In Arizona, RCRA is implemented by ADEQ's Waste Programs Division, which is responsible for permitting facilities that treat, store or dispose of hazardous waste and for approving solid waste facility plans. According to ADEQ (2005g), the following types of facilities are subject to solid waste facility plan approval or will be once appropriate rules are promulgated.

- Biosolids Processing Facilities
- Composting Facilities
- Medical Waste Facilities
- Municipal Solid Waste Landfills
- Recycling Facilities
- Non Municipal Solid Waste Landfills
- Solid Waste Storage Facilities
- Special Waste Facilities
- Transfer Stations
- Waste Tire Collection Sites

10.7.5. CERCLA

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), also known as Superfund, was enacted by Congress in 1980. CERCLA provides broad federal authority to respond to releases or threatened releases of hazardous substances that may endanger public health or the environment. The EPA maintains the National Priorities List, which is the list of national priorities among the known or threatened hazardous releases. The list guides the EPA in determining which sites warrant further investigation. Long-term remedial actions may only be taken at sites on the National Priorities List. The Tucson International Airport Area is the only site in Pima County on the National Priorities List.

10.7.6. WQARF

Arizona's Water Quality Assurance Revolving Fund (WQARF) supports cleanup of hazardous substance releases in Arizona. It is funded by legislative appropriations, cost recovery from responsible parties, taxes and fees. ADEQ maintains the "WQARF" registry, which is a list of sites most in need of cleanup. WQARF sites in Pima County are discussed in Chapter 3.

10.7.7. Nonpoint source program

ADEQ's Nonpoint Source Program focuses on the following land uses, which can negatively impact water quality (ADEQ, 2003):

- Agriculture
- Forestry
- Urban runoff
- Hydromodification
- Onsite/septic waste treatment systems
- Mining
- Recreation

The program is implemented using a watershed-based approach, working closely with stakeholders and local communities. Arizona's Nonpoint Source State Management Plan provides a framework for cooperative efforts and strategies to control nonpoint source pollution statewide.

10.7.8. Pretreatment

Pretreatment is required for wastewater treatment facilities 5 MGD or greater (Taunt, 2005). Pima County Wastewater Management Department is the only DMA with facilities of this size. Their pretreatment program is described as follows (Pima County Wastewater, 2002):

> The Industrial Waste Control Group (IWC) is the pre-treatment arm of the Treatment Division. IWC has jurisdiction over commercial sewer users in the incorporated and unincorporated areas within Pima County boundaries. Because it has jurisdiction throughout the county, IWC is able to achieve consistency in permitting, monitoring, and enforcing discharge requirements. The Field Services Unit of IWC monitors all Significant Industrial Users of the system twice a year. Significant Industrial Users are those businesses that have discharges that significantly impact the sanitary sewage conveyance system or treatment facilities. Strict procedures are adhered to in gathering samples.

10.8. PUBLIC PARTICIPATION

Public participation in PAG's 208 Planning program will be guided by PAG's Public Involvement Policy and all applicable federal and state requirements, including 40 CFR25, R18-1-401 and R18-1-402 of the Arizona Administrative Code, and ADEQ's *Continuing Planning Process*. Public participation goals will be met primarily through:

- notification of interested parties and potentially affected property owners;
- review of plans and proposals by advisory committees;
- public hearings; and
- prominently posting information on PAG's web site.

Additional details are available in the discussion of the 208 Plan Amendment process (see below), in ADEQ's *Continuing Planning Process,* and in PAG's Public Involvement Policy document.

10.9. TITLE VI AND ENVIRONMENTAL JUSTICE

EPA (2001) defines environmental justice as the "fair treatment of people of all races, cultures, and incomes with respect to the development, implementation and enforcement of all environmental laws and policies and their meaningful involvement in the decision making processes of the government." Title VI of the 1964 Civil Rights Act provides a key legal basis for environmental justice. In addition, concern that minority populations and/or low-income populations bear a disproportionate amount of adverse health and environmental effects, led to the issuance of Executive Order 12898 on Environmental Justice, which applies to a wider population than Title VI.

Taken together, Title VI and Environmental Justice stakeholders are individuals and protected populations, including: (a) minorities based on race, religion, or national origin; (b) low income residents; (c) elderly residents; and (d) disabled residents. PAG staff will take a number of proactive measures to provide full and fair participation in water quality planning by all potentially affected communities, including striving to achieve and maintain a high level of diversity on advisory committees, use of up-to-date maps identifying Title VI and Environmental Justice protected populations, and communication in a culturally sensitive manner.

As a recipient of federal funding, PAG is subject not only to Executive Order 12898 on Environmental Justice and Title VI of the 1964 Civil Rights Act, but also Executive Order 13166 on Improving Access to Services for Persons with Limited English Proficiency, and the Americans with Disabilities Act. PAG's Public Involvement Policy provides a thorough description of PAG's efforts to ensure compliance with all of these requirements.

10.10. PROCEDURES FOR DETERMINING WHETHER A FACILITY OR PERMIT IS CONSISTENT WITH THE 208 PLAN

A 208 Consistency Review is conducted in a variety of circumstances, including:

- receipt by ADEQ of an application for an Arizona Pollutant Discharge Elimination System (AZPDES) permit;
- receipt by ADEQ of an application for an Aquifer Protection Permit for a new wastewater treatment facility;
- receipt by ADEQ of an application for an Aquifer Protection Permit for an existing wastewater treatment facility that is proposed to be expanded;
- receipt by ADEQ or PAG of an inquiry from parties planning to submit any of the above permit applications;
- receipt by ADEQ or PAG of an inquiry from parties considering construction of a new wastewater treatment facility or expansion of an existing wastewater treatment facility.

ADEQ, in consultation with PAG, will make the ultimate determination of 208 Consistency or lack thereof. In general, a facility (or a permit for a facility) will be considered consistent with the 208 Plan if the facility is identified in the plan, provided that the proposed facility's location, owner, service area and capacity are consistent with the 208 Plan. If not, the proposal will usually be considered inconsistent with the 208 Plan, unless it falls under a policy, described elsewhere in this document, that indicates otherwise.

In the case of large (greater than or equal to 5 MGD) public facilities or all private facilities, if a proposal is determined to be inconsistent with the 208 Plan, a 208 Plan Amendment will be necessary before construction can commence or permits can be issued. In the case of proposals involving construction of new, or expansion of existing, small (less than 5 MGD) public facilities owned and operated by a Designated Management Agency, PAG Regional Council approval of a 208 Consistency Report will be required.

10.11. PROCEDURES FOR AMENDING THE 208 PLAN

The following is the process that must be followed for 208 Plan Amendments addressing the construction of new wastewater treatment facilities or expanding existing wastewater treatment facilities.

1. A party requesting a change to the 208 Plan must first contact the appropriate Designated Management Agency (Pima County or Sahuarita) to obtain a letter indicating that the DMA declines to provide service to the area in question.
2. The party requesting a change to the 208 Plan contacts the PAG member jurisdiction where the facility will be located and requests jurisdictional sponsorship of the project. Sponsorship does not mean support; it only indicates a willingness to investigate the possibility of such a project and a desire to place the item on the agenda for the monthly meeting of PAG's Regional Council.
3. The jurisdiction contacts PAG staff and asks that an item be placed on the Regional Council's monthly meeting agenda directing staff to initiate the 208 Planning Process. This request may come from an elected official or a representative of the Manager's/Administrator's office. The item will be placed on the agenda for the Regional Council's monthly meeting.
4. The Regional Council directs staff to begin the 208 planning process.
5. The party requesting the amendment pays PAG a processing fee ($3,500 as of July 2005).
6. A "Scope of Work" Task Force is convened to determine the scope of work for the plan amendment report. The Scope of Work Task Force will consist of representatives of entities with a direct stake in the project, such as the Designated Management Agency, the jurisdiction in which the project will be located, and the water provider whose service area includes the project site. The task force could also include additional EPAC and Watershed Planning Subcommittee members wishing to serve on the task force.
7. A draft report is prepared by the party requesting the amendment; several copies are submitted to the Scope of Work Task Force for review.
8. The Scope of Work Task Force determines if the draft plan amendment report contains the necessary elements and adequately addresses any issues. If so, the report is submitted to the Watershed Planning Subcommittee of PAG's Environmental Planning Advisory Committee (EPAC).
9. The Watershed Planning Subcommittee of EPAC reviews the report and makes a recommendation to EPAC.
10. EPAC reviews the report and makes a recommendation to the Regional Council.
11. A public hearing is held (requires 45-day legal notice).

12. PAG's Management Committee reviews the proposal, EPAC's recommendation, and the results of the public hearing, and determines whether the proposal will be forwarded to the Regional Council. (The Management Committee usually meets once a month.)
13. PAG Regional Council action. (The Regional Council usually meets once a month, roughly two weeks after the Management Committee meets.)
14. Action at the statewide Water Quality Management Working Group in Phoenix (meets every other month).
15. ADEQ approval.
16. Governor's office approval.
17. EPA approval.

10.12. CONTENTS OF 208 PLAN AMENDMENTS

208 Plan Amendments must adhere to ADEQ's content requirements, which are documented in a checklist (Appendix C). In addition, PAG has created a standard outline, approved by the Regional Council on October 27, 1999, that should be followed by anyone preparing a 208 Plan Amendment for new private wastewater treatment plants (Appendix G).

10.13. 208 PLAN AMENDMENTS ESTABLISHING NEW DESIGNATED MANAGEMENT AGENCIES

At its June 24, 1998, regular meeting, the PAG Regional Council adopted the following criteria for a DMA status change 208 Plan Amendment:

1) A single 208 Plan Amendment must be processed which includes:
   - Self-Certification information;
   - A map of the area to which the DMA status change applies; and
   - A letter of acknowledgment from Pima County that this will change its DMA status unless Pima County unreasonably withholds the letter of understanding.

2) In addition, a 20-year wastewater plan may be included in the DMA status change 208 Plan Amendment or may be processed concurrently with the DMA status change 208 Plan Amendment as a second 208 Plan Amendment.

At the time that these criteria were adopted, Pima County was the only Designated Management Agency in the PAG region. Sahuarita has since been established as the second Designated Management Agency in the region. In the future, a letter from the appropriate Designated Management Agency, acknowledging that the proposal would change its DMA status, will be required for 208 Plan Amendments establishing new Designated Management Agencies. 208 Plan Amendments establishing new Designated Management agencies must follow the procedures followed for other 208 Plan Amendments.

10.14. PROCEDURES FOR 208 CONSISTENCY REPORTS

208 Consistency Reports are prepared for new wastewater treatment facilities or expansions of existing wastewater treatment facilities that are owned and operated by Designated Management Agencies and that have a capacity less than 5 MGD capacity. The following is the process that is followed. 208 Consistency Reports are only prepared for public facilities. All

private facilities require a 208 Plan Amendment, unless they are otherwise deemed consistent with the 208 Plan.

1) Designated Management Agency interested in building or expanding a facility notifies PAG staff of the need for the report.
2) PAG staff and the DMA staff work together to prepare a draft report for review by local jurisdictions, interested parties and ADEQ.
3) PAG staff mail a written notice to all property owners within ½ mile of the project site, and other potentially interested parties. The notice must identify the project location, include a description of the project, discuss possible impacts to local residents, explain how the project will be funded, explain where to obtain more information, explain where and when a decision will be made, and how to provide input. The notice must be mailed at least one week prior to PAG's Environmental Planning Advisory Committee's (EPAC) scheduled action on the proposal.
4) EPAC reviews the proposal at its regular monthly meeting. The draft report must be made available to all EPAC members at least one week in advance of the meeting. EPAC issues a formal recommendation on the proposal. (EPAC could choose to refer the matter to the Watershed Planning Subcommittee for further review before making a decision.)
5) PAG staff prepares a summary of public involvement efforts and public input received.
6) PAG's Management Committee reviews the proposal along with staff's report on public input and guidance provided by EPAC.
7) PAG's Regional Council reviews the report, taking into consideration EPAC's recommendation, Management Committee's recommendation, and public input. Regional Council takes formal action on the proposal.
8) PAG provides ADEQ with a copy of the approved report so that ADEQ can make a 208 Consistency determination and issue the necessary permits.

10.15. CONTENTS OF 208 CONSISTENCY REPORTS

The 208 Consistency Report must contain all of the information that the PAG Regional Council will need to determine whether the proposal is consistent with the region's water quality management planning goals and policies. Also, in consideration of the fact that ADEQ is ultimately responsible for all 208 consistency determinations, the report also should contain information that ADEQ believes is necessary.

In general, a 208 Consistency Report will not contain as much information as a 208 Plan Amendment, but it should contain the following information at a minimum:

- Discussion of the purpose of the document and the reason a new or expanded facility is being proposed;
- Description of existing facility(s) (if any), including location, treatment method and capacity;
- Discussion of alternatives considered;
- Identification of the preferred alternative and the reason it is preferred;
- Delineation of the area that will be served by the new or expanded facility;
- Identification of the facility owner and operator;
- Description of the treatment process, capacity and effluent quality;
- Identification of effluent disposal method or effluent reuse sites;

- Discussion of impacts on surrounding land uses, water quality and air quality;
- Explanation of how the project will be funded.

10.16. 208 PLAN AMENDMENT PROCESSING FEES

On February 22, 1984, the PAG Regional Council approved implementation of a processing fee of $3,500 for the administration of amendments to the Areawide Water Quality Management Plan. The Regional Council's action stated the following:

> "The fee will apply to private and public entities alike; private entities may have the fees rebated through sewer connection fee credits; public entities will pay the amendment processing costs when the amendment is outside the scope of any intergovernmental agreement between PAG and the respective agency; and, the processing fee will be reviewed annually."

10.17. ECONOMIC, SOCIAL AND ENVIRONMENTAL IMPACTS OF PLAN

For the most part, this 208 Plan Update reflects the content and policies of the original 208 Plan and previous amendments and updates to the plan. Therefore, the economic, social and environmental impacts of this update are expected to be minimal. The impacts that it does have are expected to be positive. No negative impacts on existing wastewater treatment facilities or service areas are anticipated. The watershed framework in which the plan is presented should produce no new impacts.

The key features of this 208 Plan Update are that it continues the policy of regionalizing wastewater treatment, and that it provides for the continued expansion of existing facilities. The regionalization policy provides benefits from regulatory efficiency and economies of scale aspects, and the provisions for WWTF expansions allow the region to continue to grow. The plan also provides social benefits by minimizing "not-in-my-backyard" conflicts and by ensuring that communities, residents and businesses have adequate sewage treatment capacity. The plan provides environmental benefits by limiting the number of point source discharges in the region, by encouraging effluent reuse, and by ensuring that the highest value waterbodies are protected from pollutant discharges.

10.18. UPDATING THIS PLAN

PAG intends to update the 208 Plan approximately every five years. A five-year interval was chosen for future 208 Plan updates in order to be consistent with ADEQ's watershed framework and the duration of individual AZPDES permits. PAG will update the 208 Plan at shorter intervals if the need arises. Significant changes in population projections, new TMDLs, or approval of several 208 Plan Amendments for new wastewater treatment facilities could prompt PAG to update the 208 Plan. As with this and previous updates to the 208 Plan, future updates will proceed through a thorough review and approval process, which will include a public hearing and action by EPAC and the Watershed Planning Subcommittee prior to submittal to the PAG Regional Council.

10.19. PERMITTING

Under federal and state environmental laws and regulations, various permitting decisions must be made in accordance with 208 Plans. In particular, Aquifer Protection Permits (APPs) and

National Pollutant Discharge Elimination System (NPDES or “AZPDES” in Arizona) permits may only be issued once conformance with the applicable 208 Plan has been demonstrated. This document identifies all of the wastewater treatment facilities that are consistent with the PAG 208 Plan. Therefore, this document is intended to provide ample demonstration of 208 conformance, and issuance of APPs and AZPDES permits to these facilities should be allowed. Additional permits, such as effluent reuse permits, 404 permits, and permits for the discharge of stormwater, may also be required for all of the facilities listed in this plan.

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APPENDIX A

40 CFR 130.6

TITLE 40 PART 130
130.6 WATER QUALITY MANAGEMENT PLANS

SOURCE: http://www.access.gpo.gov/nara/cfr/cfrhtml_00/Title_40/40cfr130_00.html

(a) *Water quality management (WQM) plans.* WQM plans consist of initial plans produced in accordance with sections 208 and 303(e) of the Act and certified and approved updates to those plans. Continuing water quality planning shall be based upon WQM plans and water quality problems identified in the latest 305(b) reports. State water quality planning should focus annually on priority issues and geographic areas and on the development of water quality controls leading to implementation measures. Water quality planning directed at the removal of conditions placed on previously certified and approved WQM plans should focus on removal of conditions which will lead to control decisions.

(b) *Use of WQM plans.* WQM plans are used to direct implementation. WQM plans draw upon the water quality assessments to identify priority point and nonpoint water quality problems, consider alternative solutions and recommend control measures, including the financial and institutional measures necessary for implementing recommended solutions. State annual work programs shall be based upon the priority issues identified in the State WQM plan.

(c) *WQM plan elements.* Sections 205(j), 208 and 303 of the Act specify water quality planning requirements. The following plan elements shall be included in the WQM plan or referenced as part of the WQM plan if contained in separate documents when they are needed to address water quality problems.

(1) *Total maximum daily loads.* TMDLs in accordance with sections 303(d) and (e)(3)(C) of the Act and § 130.7 of this part.

(2) *Effluent limitations.* Effluent limitations including water quality based effluent limitations and schedules of compliance in accordance with section 303(e)(3)(A) of the Act and § 130.5 of this part.

(3) *Municipal and industrial waste treatment.* Identification of anticipated municipal and industrial waste treatment works, including facilities for treatment of stormwater-induced combined sewer overflows; programs to provide necessary financial arrangements for such works; establishment of construction priorities and schedules for initiation and completion of such treatment works including an identification of open space and recreation opportunities from improved water quality in accordance with section 208(b)(2) (A) and (B) of the Act.

(4) *Nonpoint source management and control.*

> (i) The plan shall describe the regulatory and non-regulatory programs, activities and Best Management Practices (BMPs) which the agency has selected as the means to control nonpoint source

pollution where necessary to protect or achieve approved water uses. Economic, institutional, and technical factors shall be considered in a continuing process of identifying control needs and evaluating and modifying the BMPs as necessary to achieve water quality goals.

(ii) Regulatory programs shall be identified where they are determined to be necessary by the State to attain or maintain an approved water use or where non-regulatory approaches are inappropriate in accomplishing that objective.

(iii) BMPs shall be identified for the nonpoint sources identified in section 208(b)(2)(F)-(K) of the Act and other nonpoint sources as follows:

(A) *Residual waste.* Identification of a process to control the disposition of all residual waste in the area which could affect water quality in accordance with section 208(b)(2)(J) of the Act.

(B) *Land disposal.* Identification of a process to control the disposal of pollutants on land or in subsurface excavations to protect ground and surface water quality in accordance with section 208(b)(2)(K) of the Act.

(C) *Agricultural and silvicultural.* Identification of procedures to control agricultural and silvicultural sources of pollution in accordance with section 208(b)(2)(F) of the Act.

(D) *Mines.* Identification of procedures to control mine-related sources of pollution in accordance with section 208(b)(2)(G) of the Act.

(E) *Construction.* Identification of procedures to control construction related sources of pollution in accordance with section 208(b)(2)(H) of the Act.

(F) *Saltwater intrusion.* Identification of procedures to control saltwater intrusion in accordance with section 208(b)(2)(I) of the Act.

(G) *Urban stormwater.* Identification of BMPs for urban stormwater control to achieve water quality goals and fiscal analysis of the necessary capital and operations and maintenance expenditures in accordance with section 208(b)(2)(A) of the Act.

(iv) The nonpoint source plan elements outlined in § 130.6(c)(4)(iii)(A)(G) of this regulation shall be the basis of water quality activities implemented through agreements or memoranda of understanding between EPA and other departments, agencies or instrumentalities of the United States in accordance with section 304(k) of the Act.

(5) *Management agencies.* Identification of agencies necessary to carry out the plan and provision for adequate authority for intergovernmental cooperation in accordance with sections 208(b)(2)(D) and 303(e)(3)(E) of the Act. Management agencies must demonstrate the legal, institutional, managerial and financial capability and specific activities necessary to carry out their responsibilities in accordance with section 208(c)(2)(A) through (I) of the Act.

(6) *Implementation measures.* Identification of implementation measures necessary to carry out the plan, including financing, the time needed to carry out the plan, and the economic, social and environmental impact of carrying out the plan in accordance with section 208(b)(2)(E).

(7) *Dredge or fill program.* Identification and development of programs for the control of dredge or fill material in accordance with section 208(b)(4)(B) of the Act.

(8) *Basin plans.* Identification of any relationship to applicable basin plans developed under section 209 of the Act.

(9) *Ground water.* Identification and development of programs for control of ground-water pollution including the provisions of section 208(b)(2)(K) of the Act. States are not required to develop ground-water WQM plan elements beyond the requirements of section 208(b)(2)(K) of the Act, but may develop a ground-water plan element if they determine it is necessary to address a ground-water quality problem. If a State chooses to develop a ground-water plan element, it should describe the essentials of a State program and should include, but is not limited to:

(i) Overall goals, policies and legislative authorities for protection of ground-water.

(ii) Monitoring and resource assessment programs in accordance with section 106(e)(1) of the Act.

(iii) Programs to control sources of contamination of ground-water including Federal programs delegated to the State and additional programs authorized in State statutes.

(iv) Procedures for coordination of ground-water protection programs among State agencies and with local and Federal agencies.

(v) Procedures for program management and administration including provision of program financing, training and technical assistance, public participation, and emergency management.

(d) *Indian Tribes.* An Indian Tribe is eligible for the purposes of this rule and the Clean Water Act assistance programs under 40 CFR part 35, subparts A and H if:

(1) The Indian Tribe has a governing body carrying out substantial governmental duties and powers;

(2) The functions to be exercised by the Indian Tribe pertain to the management and protection of water resources which are held by an Indian Tribe, held by the United States in trust for Indians, held by a member of an Indian Tribe if such property interest is subject to a trust restriction on alienation, or otherwise within the borders of an Indian reservation; and

(3) The Indian Tribe is reasonably expected to be capable, in the Regional Administrator's judgment, of carrying out the functions to be exercised in a manner consistent with the terms and purposes of the Clean Water Act and applicable regulations.

(e) *Update and certification.* State and/or areawide agency WQM plans shall be updated as needed to reflect changing water quality conditions, results of implementation actions, new requirements or to remove conditions in prior conditional or partial plan approvals. Regional Administrators may require that State WQM plans be updated as needed. State Continuing Planning Processes (CPPs) shall specify the process and schedule used to revise WQM plans. The State shall ensure that State and areawide WQM plans together include all necessary plan elements and that such plans are consistent with one another. The Governor or the Governor's designee shall certify by letter to the Regional Administrator for EPA approval that WQM plan updates are consistent with all other parts of the plan. The certification may be contained in the annual State work program.

(f) *Consistency.* Construction grant and permit decisions must be made in accordance with certified and approved WQM plans as described in §§ 130.12(a) and 130.12(b).

[50 FR 1779, Jan. 11, 1985, as amended at 54 FR 14360, Apr. 11, 1989; 59 FR 13818, Mar. 23, 1994]

APPENDIX B

PAG REGIONAL COUNCIL APPROVAL OF RESOLUTION 78-12-07

VIII. ARMY CORPS OF ENGINEERS TUCSON URBAN STUDY

ACTION:

Motion was made by Mayor Eckstrom, seconded by Mayor Engle, and unanimously carried that the Regional Council of the Pima Association of Governments accept its proposed role in the Tucson Urban Study and endorse the selection procedure as outlined by the Army Corps of Engineers for the Citizen Steering Committee.

IX, OTHER BUSINESS

A. PROPOSED WATER QUALITY RESOLUTION NO. 78-12-07

MOTION:

Motion made by Mayor Eckstrom and seconded by Mayor Murphy that the Regional Council of the Pima Association of Governments adopt Water Resolution No. 78-12-07.

AMENDMENTS:

Amendment offered by Mayor Murphy seconded by Mayor Engle and accepted by Mayor Eckstrom to revise the resolution as follows:

Section 1. That the Pima Association of Governments Regional Council concurs with the actions taken by the City of Tucson and Pima County, in adopting a Regional Facilities Plan, consolidating management, operations, and ownership of the Regional Sewerage systems.

Section 3. That the details and four City stipulated conditions of transfer of the sewerage system of the City of Tucson to Pima County will be addressed in an implementation plan transmitted to the State of Arizona and the U.S. Environmental Protection Agency as part of the documentation associated with the three studies in the metropolitan facilities plan through the normal construction grant process. The aforementioned City stipulated conditions shall be implementation shall be executed not later than June 30, 1979.

DISCUSSION:

The exact wording of the amendment was discussed as to whether it clearly reflected actions previously taken by the City of Tucson and Pima County on the matter.

ACTION:

Motion and amendment carried unanimously.

WATER QUALITY RESOLUTION
NO. 78-12-07

A RESOLUTION OF THE REGIONAL COUNCIL OF THE PIMA ASSOCIATION OF GOVERNMENTS (PAG) REQUESTING THAT THE GOVERNOR OF ARIZONA RECOGNIZE PIMA COUNTY AS THE DESIGNATED 208 MANAGEMENT AGENCY FOR MUNICIPAL WASTE-WATER TREATMENT AND SEWER SYSTEM OPERATIONS UNDER THE WATER POLLUTION CONTROL ACT AMENDMENTS OF 1972 AND 1977 (p.l. 92-500 and p.l. 95-217)

WHEREAS Pima County and the City of Tucson have been legally designated to construct, own and operate sewerage systems in their respective jurisdictions; and

WHEREAS the locally adopted 208 plan identified a planning process to evaluate ways to consolidate the management, ownership and operation of city and county sewerage systems; and

WHEREAS both Pima County and the City of Tucson have acted to approve and adopt the metropolitan facilities plan including the technical study with flow management and solids handling addenda prepared by Brown and Caldwell, Inc., the financial study prepared by Coopers and Lybrand, certified Public Accountants, and the management study prepared by Arthur D. Little, Inc. as well as an intergovernmental agreement relating to coordinated financing and planning of the metropolitan sewerage system for Fiscal 1978-1979; and

WHEREAS both Pima County and the City of Tucson have agreed by adopting the Arthur D. Little Management study that the city's sewerage system, ownership and all responsibilities for the construction, operation, and maintenance thereof shall be transferred to Pima County by June 30, 1979

NOW, THEREFORE, BE IT RESOLVED by the Regional Council of the Pima Association of Governments as follows:

Section 1. That the Pima Association of Governments Regional Council concurs with the actions taken by the City of Tucson and Pima County, in adopting a Regional Facilities Plan, consolidating management, operations, and ownership of the Regional Sewerage systems.

Section 2. That on or before June 30, 1979 a complete transfer of treatment plants, conveyance systems, personnel, equipment, property and all other maps, documents, records and programs related to this transfer and necessary for the complete and proper continued operation of the seweraging system shall be accomplished whereby Pima County will be the sole management and operating agency of sewerage systems in the designated Pima Association of Governments Planning Area.

Section 3. That the details and four City stipulated conditions of transfer of the sewerage system of the City of Tucson to Pima County will be addressed in an implementation plan transmitted to the State of Arizona and the U.S. Environmental Protection Agency as part of the documentation associated with the three studies in the metropolitan facilities plan through the normal construction grant process. The aforementioned City stipulated conditions shall be implemented or legal documents assuring their implementation shall be executed not later than June 30, 1979.

Adopted this 21st day of December, 1978.

Signed: E. S. Bud Walker
E.S. "Bud" Walker
Chairman
PAG

ATTEST:

Thomas L. Swanson
Executive Director/Secretary

APPENDIX C

ADEQ CHECKLIST
FOR 208 PLAN AMENDMENTS

208 AMENDMENT CHECKLIST

Section 208 Clean Water Act

40 CFR Part 130.6

REQUIREMENT	PROVIDE BRIEF SUMMARY OF HOW REQUIREMENTS ARE ADDRESSED	ADDRESSED ON PAGE:
AUTHORITY Proposed Designated Management Agency (DMA) shall self-certify that it has the authorities required by Section 208(c)(2) of the Clean Water Act to implement the plan for its proposed planning and service areas. Self-certification shall be in the form of a legal opinion by the DMA or entity attorney.		
20-YEAR NEEDS {Clearly describe the existing wastewater treatment (WWT) facilities:} Describe existing WWT facilities.		
Show WWT certified and service areas for private utilities and sanitary district boundaries if appropriate.		
{Clearly describe alternatives and the recommended WWT plan:} Provide POPTAC population estimates (or COG-approved estimates only where POPTAC not available) over 20-year period.		

Provide wastewater flow estimates over the 20-year planning period.		
Illustrate the WWT planning and service areas.		
Describe the type and capacity of the recommended WWT Plant.		
Identify water quality problems, consider alternative control measures, and recommend solution for implementation.		
If private WWT utilities with certificated areas are within the proposed regional service area, define who (municipal or private utility) serves what area and when. Identify whose sewer lines can be approved in what areas and when?		
Describe method of effluent disposal and reuse sites (if appropriate).		
If Sanitary Districts are within a proposed planning or service area, describe who serves the Sanitary Districts and when.		
Describe ownership of land proposed for plant sites and reuse areas.		

Address time frames in the development of the treatment works.		
Address financial constraints in the development of the treatment works.		
Describe how discharges will comply with EPA municipal and industrial stormwater discharge regulations (Section 405, CWA).		
Describe how open areas & recreational opportunities will result from improved water quality and how those will be used.		
Describe potential use of lands associated with treatment works and increased access to water-based recreation, if applicable.		
<u>REGULATIONS</u> Describe types of permits needed, including NPDES, APP and reuse.		
Describe restrictions on NPDES permits, if needed, for discharge and sludge disposal.		
Provide documentation of communication with ADEQ Permitting Section 30 to 60 days prior to public hearing regarding the need for specific permits.		
Describe pretreatment requirements and method of adherence to requirements (Section 208 (b)(2)(D), CWA).		

Identify, if appropriate, specific pollutants that will be produced from excavations and procedures that will protect ground and surface water quality (Section 208(b)(2)(K) and Section 304, CWA).		
Describe alternatives and recommendation in the disposition of sludge generated. (Section 405 CWA)		
Define any nonpoint issues related to the proposed facility and outline procedures to control them.		
Describe process to handle all mining runoff, orphan sites and underground pollutants, if applicable.		
If mining related, define where collection of pollutants has occurred, and what procedures are going to be initiated to contain contaminated areas.		
If mining related, define what specialized procedures will be initiated for orphan sites, if applicable.		
<u>CONSTRUCTION</u> Define construction priorities and time schedules for initiation and completion.		
Identify agencies who will construct, operate and maintain the facilities and otherwise carry out the plan.		

Identify construction activity-related sources of pollution and set forth procedures and methods to control, to the extent feasible, such sources.		
FINANCING AND OTHER MEASURES NECESSARY TO CARRY OUT THE PLAN If plan proposes to take over certificated private utility, describe how, when and financing will be managed.		
Describe any significant measure necessary to carry out the plan, e.g., institutional, financial, economic, etc.		
Describe proposed method(s) of community financing.		
Provide financial information to assure DMA has financial capability to operate and maintain wastewater system over its useful life.		
Provide a time line outlining period of time necessary for carrying out plan implementation.		
Provide financial information indicating the method and measures necessary to achieve project financing. (Section 201 CWA or Section 604 may apply.)		

IMPLEMENTABILITY Describe impacts and implementability of Plan: Describe impacts on existing wastewater (WW) facilities, e.g., Sanitary district, infrastructure/facilities and certificated areas.		
Describe how and when existing package plants will be connected to a regional system.		
Describe the impact on communities and businesses affected by the plan.		
If a municipal wastewater (WWT) system is proposed, describe how WWT service will be provided until the municipal system is completed: i.e., will package plants and septic systems be allowed and under what circumstances. (Interim services).		
PUBLIC PARTICIPATION Submit copy of mailing list used to notify the public of the public hearing on the 208 amendment. (40 CFR, Chapter 1, Part 25.5)		
List location where documents are available for review at least 30 days before public hearing.		

Submit copy of the public notice of the public hearing as well as an official affidavit of publication from the area newspaper. Clearly show the announcement appeared in the newspaper at least 45 days before the hearing.		
Submit affidavit of publication for official newspaper publication.		
Submit responsiveness summary for public hearing.		

APPENDIX D

SAMPLING RESULTS
FROM ADEQ'S 2004 DRAFT 305B REPORT

APPENDIX E

STATE OF ARIZONA EXECUTIVE ORDER 70-2 AND GOVERNOR WILLIAMS' DESIGNATION LETTER

E X E C U T I V E O R D E R

70-2

RELATING TO THE INTERGOVERNMENTAL COOPERATION ACT OF 1968, PUBLIC LAW 90-577, AND THE ESTABLISHMENT OF PLANNING DISTRICTS WITHIN THE STATE OF ARIZONA

WHEREAS, the Intergovernmental Cooperation Act of 1968, Public Law 90-577, places certain responsibilities upon the states for coordination of Federal, State and local plans and projects; and

WHEREAS, the Bureau of the Budget, charged by Congress for implementation of said Act has issued a series of Circulars, A-80, A-82, A-95 and A-96 pertaining thereto; and

WHEREAS, Circular A-80 said in part, "the multiplicity of unrelated planning jurisdictions and activities now existing under various federal programs inhibits their most effective operation." To help correct this situation, the President called for procedures which would encourage:

"State and local planning agencies to work together in using common or consistent planning bases and in sharing planning facilities and resources, and utilization of common boundaries for planning and development districts or regions assisted by the Federal Government and consistency of such districts with established state planning and development districts and regions."

WHEREAS, it is the responsibility of the State to encourage local initiative in developing organizational and procedural arrangements for coordinating comprehensive and functional activities and to avoid overlap, duplication, and competition between local planning activities; and

WHEREAS, the State must exercise its leadership in delineating and establishing a system of planning and development districts which provide a consistent geographic base for the coordination of federal, state and local development programs; and

WHEREAS, Executive Order 69-6 was issued on the 28th day of October 1969, which established preliminary planning districts pending the completion of a study to determine the most suitable and logical boundaries for planning districts within the State; and

WHEREAS, The Department of Economic Planning and Development has completed said study, and

WHEREAS, Bureau of the Budget Circulars A-95 and A-96, which supercede, in part, Circulars A-80 and A-82, and which require, as of October 1, 1969, the establishment of a Project Notification and Review System based upon compatible planning jurisdictions in order to facilitate the development of coordinated regions and statewide planning and review activities with regard to many federal programs, demand immediate action on the part of the State of Arizona and the executive branch of government to establish a statewide clearing house to effectuate the Project Notification System required

by Bureau of the Budget Circulars A-95 and A-96; and

WHEREAS, there have been a number of proposals from both federal and local agencies to establish planning areas within the State which, if implemented, would lead to gross duplication and overlapping of geographic and functional areas of concern;

NOW, THEREFORE, I, Jack Williams, Governor of the State of Arizona, do hereby direct that the State of Arizona be divided into six planning districts described as follows:

PLANNING DISTRICTS

1. Maricopa County
2. Pima County
3. Apache County
   Coconino County
   Navajo County
   Yavapai County
4. Mohave County
   Yuma County
5. Gila County
   Pinal County
6. Cochise County
   Graham County
   Greenlee County
   Santa Cruz County

All planning functions currently under way, or to be undertaken, on a district, regional or area-wide basis within the state are now asked to conform to the prescribed planning areas or combinations thereof. All general or special purpose planning jurisdictions established, or to be established, and all planning programs undertaken pursuant thereto by federal agencies, state or local jurisdictions or combinations of local jurisdictions are requested to conform to said boundaries.

IN WITNESS WHEREOF, I have hereunto set my hand and caused to be affixed the Great Seal of the State of Arizona.

DONE at the Capitol in Phoenix this 8th day of July in the year of Our Lord One Thousand Nine Hundred and Seventy and of the Independence of the United States the One Hundred and Ninety-fifth.

Jack Williams
GOVERNOR

ATTEST:

Wesley Bolin
Secretary of State

Exhibit 1

LLIAMS
NOR

OFFICE OF THE GOVERNOR
STATE HOUSE
PHOENIX, ARIZONA 85007

IN REPLY
REFER TO:

March 25, 1974

Mr. Paul DeFalco, Jr.
Regional Administrator
U. S. Environmental Protection Agency
100 California Street
San Francisco, California 94111

Dear Mr. DeFalco:

In accordance with Section 208 of the Federal Water Pollution Control Act, I hereby designate the Maricopa Association of Governments as the agency responsible for area-wide waste treatment management planning for the Maricopa County SMSA, and the Pima Association of Governments as the agency responsible for area-wide waste treatment management planning for the Pima County SMSA.

Planning for other areas of the State not designated above will be done by the Division of Water Quality Control in cooperation with the Arizona Water Commission and the Office of Economic Planning and Development, as outlined in our State Continuing Planning Process which was approved by your office in November, 1973.

Sincerely,

Jack Williams

Jack Williams

APPENDIX F

TOWN OF SAHUARITA
1999 DMA DESCRIPTION

The service area for the proposed SWTRF will be the SSSA. The SSSA includes most of the Town, but excludes the area bounded on the north by El Toro Road west of I-19; on the west by the Southern Pacific Railroad line running along the N-S ½ section lines of Sections 22, 27 and 34 of Township 17S, Range 13E, then extending into Section 3 of Township 18S, Range 13E along the N-S ½ section line of Section 3 to Duval Road; on the east by a line drawn south of El Toro Road along I-19 to Calle de Julio, then east on Calle de Julio to Avenida de Augusto, then south on Avenida de Augusto to Calle De Marzo, then east from Calle de Marzo to the Town's eastern boundary at La Villita Road, then south on La Villita Road to the Nogales Highway, along Nogales Highway and then south of Nogales Highway along the Town's eastern boundary at the section line between Sections 35 and 36; and on the south by the Town's southern boundary along Duval and Duval Mine Roads. A portion of this excluded area is currently sewered and/or served by Pima County. (see **Figure 1.1**). The SSSA was studied and its limits defined principally on the current wastewater needs of the Town and on the areas that can geologically and hydrologically gravity feed to the SWTRF. The Town also considered Pima County's interest in continuing to serve existing customers within the Town as well as the Town's expectation that Pima County will serve all customers within the excluded area who request service. The SSSA anticipates accommodating present and future properties which could be developed at densities requiring sewers and which could logically gravity drain to the northern limits of the Town.

APPENDIX G

PAG OUTLINE
FOR 208 PLAN AMENDMENTS

208 PLAN AMENDMENT OUTLINE
FOR NEW PRIVATE WASTEWATER TREATMENT PLANTS

The purposes of this outline are to (1) provide guidance to anyone preparing a 208 Plan Amendment and (2) to assist those reviewing the proposed amendment in determining whether all requirements have been met. By following this outline, the author should meet all of PAG's and ADEQ's requirements for a 208 Plan Amendment. ADEQ's checklist, which is provided in Appendix C of this report, must be filled out and submitted to ADEQ during the 208 process. However, following PAG's outline should make it easy for the applicant to complete the state's check list. In addition to the 208 requirements, applicants must be in compliance with local ordinances as developed under Municipal AZPDES permits in order to be consistent with the 208. This proposed outline is similar to the existing outline in PAG's 1990 Guide to Areawide Water Quality Management Planning as Required under Section 208 of the Clean Water Act. It includes criteria in ADEQ's 208 Amendment Checklist and requirements set forth in the 1985 PAG/Pima County Wastewater Areawide Wastewater Management Plan Point Source Update.

Items marked with an * are items required by ADEQ, as identified in the Continuing Planning Process checklist. Items marked with ** are based on requirements in the 1985 PAG/Pima County Wastewater Areawide Wastewater Management Plan Point Source Update.

Executive Summary
Introduction
Purpose of amendment Brief description of study area location, with reference to map Rationale for amending plan (e.g., unavailable infrastructure, population growth)
Natural setting
Groundwater and surface water hydrology Depth to groundwater Groundwater flow direction Areas of natural or artificial groundwater recharge Major washes, rivers and floodplains
Groundwater quality Surface water quality (if relevant) Significant geologic or topographic constraints (if any) Proximity to existing aquatic or riparian habitats Proximity to habitat of threatened, endangered, or candidate species
Current Conditions
Population, including significant seasonal trends Land use Description and status of existing local and regional wastewater treatment facilities (if any)*
brief legal description and proximity; access service areas and sanitary district boundaries* treatment method capacity current wastewater flows compliance status
Planned expansions and improvements
local and regional wastewater conveyance system wastewater treatment facilities
Existing water quality problems (if any)*

Future Conditions
Population
POPTAC- or PAG-approved population projections for 20-year period* Proposed development within study area
Wastewater Flows
Estimates of future wastewater flows for 20-year period*
Types of wastewater flows
commercial/industrial residential septic
Potential problems prompting the need for a new facility
(e.g., lack of capacity, wastewater quality problems*, public health and safety, odors or insects, and/or regulatory compliance)
General Description and Evaluation of Alternatives for Conveyance and Treatment*
Conveyance/Location Alternatives
Feasibility Cost Environmental impacts Effluent reuse potential
Treatment method alternatives
Effluent quality and reuse potential System reliability Cost
No Action alternative

Detailed Description of Recommended Alternative*
Site Location Site size / acreage available for treatment plant Land ownership* / easement requirements System ownership / responsibility * Permits needed and restrictions specified by any existing permits* Measures to ensure public health and safety (e.g., fencing) Brief description of conveyance lines Capacity, including phases* Design life (must be a minimum of 25** years) Plan for wastewater service to neighboring areas, including flow-through conveyance
capacity and easements**
Proposed treatment process*
Effluent quality Effluent disposal* Effluent reuse potential and plans for effluent reuse (including ownership of reuse sites and ownership of effluent and re-distribution system)*
Sludge disposal*
description of alternatives* recommended alternative*
Time line for developing treatment works*
Description of how discharges will comply with EPA municipal and industrial stormwater discharge regulations*
Non-point sources of pollution related to the proposed facility and procedures to control them*
Any significant measures necessary to carry out plan (e.g., institutional, financial, economic, etc.)*
Plans for turnover of facilities to the DMA (if applicable)**

Impacts of proposed facility*
Impacts on existing wastewater facilities or regional wastewater plans* Impacts on surface water and groundwater quality Impacts on existing institutional arrangements (including Intergovernmental Agreements**) Impacts on communities and businesses affected by the plan* Location relative to 100-year flood plain and areas subject to erosion hazard, and procedures used to prevent flood or erosion damage** Impacts on surrounding land uses (e.g. wellfields, recreational facilities, residential areas, artificial recharge sites, potential pollution sources) Impacts on potentially sensitive features, including cultural sites, riparian areas, designated Unique Waters, etc. Designated use of receiving surface water body (if applicable) Description of how recreational opportunities will result from improved water quality (if applicable)* Potential use of lands associated with treatment works and increased access to water-based recreation (if applicable)* Potential for odors Potential for insect problems
Financing*
Financial constraints, if any * Cost of implementing Plan Amendment, including capital costs and operation and maintenance costs Financial impact on public** (including estimated O&M costs and sewer fees) Method of financing* Financial information demonstrating that the DMA or owner/operator has the financial capability to operate and maintain the wastewater system over its useful life* Impacts on Public Bonds, Debts, Debt Retirement Provision for bond indemnification in the event that the proposed plant does not operate as anticipated, or the developer no longer assumes responsibility for the project
Construction*
Construction priorities* Party responsible for construction* Phases Time line* Description of how wastewater service will be provided until proposed system is complete (if applicable) Description of how and when existing wastewater facilities will be connected (if applicable) Potential for specific pollutants to be produced during construction or excavation* Procedures or methods for controlling construction-activity related sources of pollution*

Description of proposed pretreatment program*
Pretreatment requirements Method of enforcement Demonstration of authority
Conclusion
Discussion of why the proposed alternative is the most desirable option for both the short term and long term** Summary of positive and negative impacts of the proposal
Study Area Map(s) showing:
Boundaries of proposed and existing service areas* Boundaries of designated management areas and planning areas (if relevant)* Location of treatment facility Conveyance lines Location(s) of nearby, existing or proposed treatment and major conveyance facilities Areas relying on septic systems within or adjacent to service area Locations of potentially-impacted land uses(e.g. wellfields, recreational facilities, residential areas, artificial recharge sites, potential pollution sources) Locations of existing and potential reuse sites* Locations of potentially sensitive features (including cultural sites, riparian areas, designated f, etc.) Locations of 100-year flood plains** Washes and rivers
Appendices
Self Certification Information for DMAs (if relevant)* Letter from DMA indicating that DMA declines to serve Assurances (bonds, letters of credit, or similar device) that the facility will be built, operated, maintained and repaired for its design life Plans for service beyond facility design life Public participation (prepared by PAG) ADEQ checklist